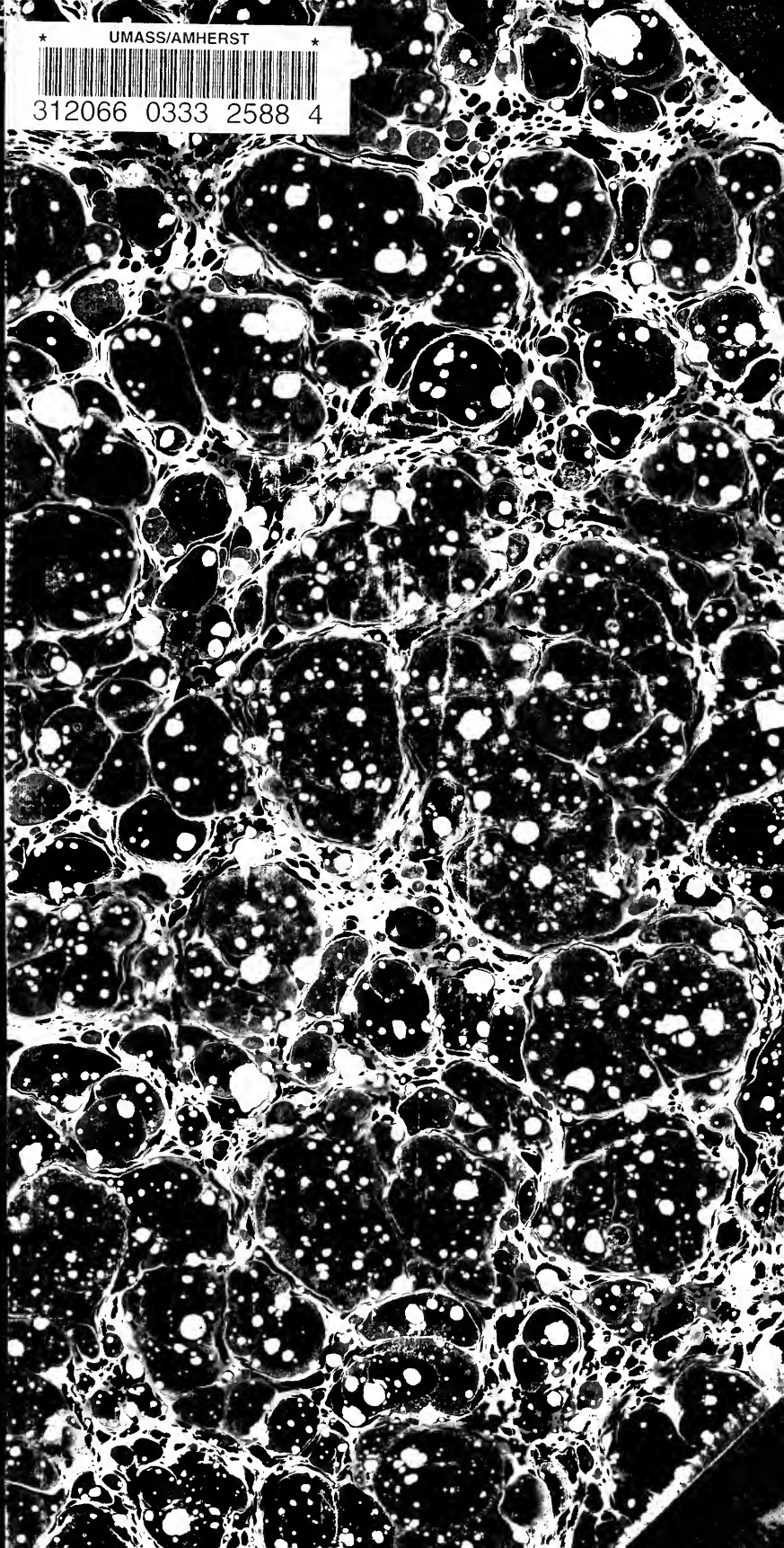


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SERIES OF 1895.

BULLETIN No. 1.

MASSACHUSETTS  
CROP REPORT

FOR THE

MONTH OF MAY, 1895.

ISSUED BY

WM. R. SESSIONS

SECRETARY STATE BOARD OF AGRICULTURE.

BOSTON:  
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,  
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1895.

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# CROP REPORT FOR THE MONTH OF MAY, 1895.

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OFFICE OF STATE BOARD OF AGRICULTURE,  
BOSTON, MASS., June 1, 1895.

Bulletin No. 1, Crop Report for the month of May, is herewith presented as the opening bulletin of the season. These crop bulletins will be issued monthly, on or about the seventh day, during the growing and harvesting seasons. Arrangements have been made with the New England Weather Service whereby weekly weather-crop bulletins will be sent Tuesdays to each person on our mailing list, and also by special arrangement to the postmasters of the Commonwealth, for posting in their respective offices. The first number issued was for date of May 6. Also, as last year, a short article by a specialist of the Board of Agriculture will be included in each issue. The article in this bulletin is furnished by the veterinarian, and treats of Tuberculin.

## REPORT ON FARM ANIMALS.

[Report No. 123, U. S. Department of Agriculture, Division of Statistics.]

### *Horses.*

The number of horses has fallen off 187,821, or 1.17 per cent, during the past year. The heaviest losses generally occurred in the central and western States, and the greatest increases in numbers in the Southern States and in the Territories. Prices have declined in all the States and Territories except Massachusetts and Nevada, the increase in the former being \$1.10. The causes generally assigned by correspondents for the falling away in the number of horses are the substitution of other motors in the street-car service of towns and cities, and the failure of food crops and consequent inability to sustain them. The decline in value is usually attributed to the widespread depression.

*Mules.*

There has been a slight general decrease in the number of mules, and the average price of this animal has fallen from \$62.17 in January, 1894, to \$47.55, same date, 1895.

*Milch Cows.*

The tendency to an increase of milch cows noted in last year's report still continues. The estimated number in January, 1895, was 16,504,629, or an increase of 0.1 per cent. The average farm value per head for the present year (1895) is \$21.97, against \$21.77 last year.

*Oxen and Other Cattle.*

The decrease in number of oxen and other cattle since the estimate in January, 1894, has been very marked, and amounts to 6.13 per cent. Accompanying this considerable decline in numbers there has been a falling off in the value per head of 60 cents.

*Sheep.*

The decline in the number of sheep was 2,753,953, and is attributed to the ravages of farm dogs and wild animals, the low price of wool, the hard times, and scarcity of feed. The price per head has also declined from \$1.98 to \$1.58.

*Hogs.*

There has been a decrease of 2.3 per cent in estimated number of swine, and the average price is \$4.97 for the year 1895, against \$5.98, Jan. 1, 1894. To scarcity of feed and cholera may be attributed principally the diminution in number of this animal. The decline in value is ascribed mainly to hard times.

*Summary.*

Horses in the United States, Jan. 1, 1895, 15,893,318, valued at \$576,730,580; mules, 2,333,108, valued at \$110,927,834; milch cows, 16,504,629, valued at \$362,601,729; oxen and other cattle, 34,364,216, valued at \$482,999,129; sheep, 12,294,064, valued at \$66,685,767; swine, 44,165,716, valued at \$219,501,267; total value of farm animals, \$1,819,446,306.

*Statistics for Massachusetts.*

Horses on farms, 65,760; average price, \$74.13; value, \$4,874,627. Milch cows on farms, 178,135; average price, \$32.50; value, \$5,789,388. Oxen and other cattle on farms, 82,965; average price, \$24.46; value, \$2,029,361. Sheep on farms, 49,383; average price, \$3.43; value, \$169,137. Swine on farms, 63,256; average price, \$8.58; value, \$542,734.

## CONDITION OF FARM ANIMALS.

By Report No. 125 of the Statistician of the United States Department of Agriculture (April, 1895) it appears from the notes of correspondents that diseases of a fatal and unusually severe nature have not prevailed generally during the year. Only from New York has mention been made of the existence of tuberculosis. Most losses have been the result of exposure, and want of the usual nourishment, owing to the scarcity of feed. Hog cholera prevails to a considerable extent in many of the States, and especially in Iowa, where one county reports a loss of 1,100 hogs in one month from this cause alone. Taking the country as a whole, the stock has come out of winter quarters in fair condition. For Massachusetts the condition of horses is given as 99; cattle, 95; sheep, 100; and swine, 97.

## CONDITION OF WINTER GRAIN.

Report No. 125, above referred to, states that the past winter has been hard on wheat. The fall of 1894 was a dry one, and in many States not favorable either to germination or to the maintenance of the vitality of the plant. The spring has also been droughty over extensive areas. Very little damage from the Hessian fly is reported.

## MAY CROP REPORT.

The May returns of the United States Department of Agriculture (Report No. 126) show an increase in condition of wheat of 1.5 points from the April average, being 82.9, against 81.4 last month and 81.4 in May, 1894. In Wisconsin, Minnesota, Kansas and Nebraska the prospects are

poor. Iowa and Missouri report favorable prospects. Winter rye, like wheat, has advanced nearly 2 points since last month, its average for May being 88.7. The prospects for rye throughout the rye belt are fair, except in the State of New York, where it is too dry, while in the States of Minnesota and Kansas the crop was considerably damaged by the severe winter, and has not recovered. The average condition of winter barley is 94, against 62.3 in the month of May, 1894. The lowest conditions are in Texas, Indiana and Iowa, and the highest in New York, California and Oregon.

The condition of spring pasture is 89.7; of mowing lands, 89.4. The proportion of spring ploughing done May 1 is reported as 82.8 per cent, against 83.5 last year and 73.4 in 1893. For Massachusetts the average condition of meadows and mowing lands May 1 is given as 96; of spring pasture, 93; proportion of ploughing work already done, 33 per cent; proportion usually done by May 1 (in an average year), 44 per cent.

#### WEATHER SUMMARY, JANUARY — APRIL, 1895.

FURNISHED BY THE NEW ENGLAND WEATHER SERVICE.

January gave slightly warmer weather than normal in the eastern part of the State, and slightly colder in central and western counties. There was no general thaw and no extremely cold weather. The precipitation was above the normal in the southern part, but less than the usual amount came in the centre and north. About the normal amount of snow fell during the month, and with the steady temperature most of it remained on the ground, giving a good protection to all roots and shrubs. The only storm of marked severity was that of the 26th–27th, when some damage was done along the coast by the wind, and travel was hindered in the interior by drifting snow.

February was cold and dry. The temperature averaged from 2 to 7 degrees a day below the normal throughout the greater part of the State. The temperature rose several degrees above freezing in south-eastern Massachusetts on the early morning of the 8th, then fell rapidly and to a low point under the influence of north-west winds which prevailed. At Provincetown the daily range on the 8th was



the greatest ever recorded there in fourteen years of observation, while the minimum on the 6th was the lowest ever registered there in that time. The precipitation was generally in the form of snow, except in the extreme south-east, and most of it came in the storm of the 7th-8th. This storm was extremely severe, and great damage was done along the coast by the high tide and terrific winds. The tide and winds probably did more damage to wharves, shipping, etc., along our coast than in any one storm for years. Several buildings were blown down or badly damaged in the vicinity of Amesbury, Mass. The ground was mostly well covered with snow throughout the month. There was some injury to peaches by the cold spell, and the very high wind drove the cold into many cellars that were considered frost-proof.

The weather for March did not depart far from the normal in any respect, though it was slightly cooler and drier than March generally gives in some places. The storms were not so severe as are many times experienced, and the snow gave a good covering on the fields and pastures, except along the immediate coast, until near the end of the month. The season opened slowly, and was later than usual at the end of the month.

April departed very little from the normal in temperature, although it was slightly warmer in central counties; but an excess of rain came, except in the extreme south-east. The storms of the 8th-9th and 13th-15th filled the ground and reservoirs; and the intervalles on rivers rising in the north were badly washed by the floods that came from the melting snow and extremely heavy rainfalls which fell there. In the Berkshire hills the highways were badly blocked by snow-drifts till after the 15th of the month. The ground was cold and the season backward, and no great amount of seed had been put into the ground in any section at the end of the month.

## NEW ENGLAND WEATHER AND CROPS.

FROM UNITED STATES WEATHER-CROP BULLETINS.

*Week ending May 6.* — Warmer than usual over greater portion of country. On north Pacific coast, in central California, over Utah, Arizona and New Mexico and over limited

areas on New England and middle Atlantic coasts the week was cooler than usual, but the deficiency in temperature was not marked. Generally the rainfall was above the average, especially in eastern Texas. Along the immediate Gulf coast, in Tennessee, the Ohio valley, and from the upper lake region eastward to the New England coast, but little rain fell during the week. Generally the week was very favorable. Corn planting had progressed rapidly in the Northern States. Cotton planting was nearing completion. Winter wheat had been unfavorably affected by warm, dry weather in Missouri and Ohio. Fruit prospects continued excellent.

*Week ending May 13.* — Notwithstanding the exceptionally low temperature for this season that occurred from the Rocky Mountains eastward to the Atlantic coast from the 11th to the 13th, the week averaged warmer than usual in all districts, except in the Southern States and over portions of the north Pacific coast. The maximum and minimum temperatures of the week were very unusual. The great feature of the week was the remarkably cool wave which overspread nearly the whole of the country east of the Rocky Mountains on the 11th, 12th and 13th, attended by freezing weather in the Northern States, and frost as far south as the Ohio valley and western portion of South Carolina. Snows occurred along the lakes in Michigan and Wisconsin. Generally the rainfall west of the Mississippi River was less than usual and to the eastward greater than usual.

*Week ending May 20.* — Week cooler than usual everywhere east of the Rocky Mountains, and from the Missouri valley eastward over the central and northern portions of the country it was decidedly cool. Week also cooler than usual on the California coast, but over the eastern portion of that State and throughout the plateau and north Pacific coast regions it was warmer than usual. The rainfall during the week was below the average over the greater portion of the country. Except light showers in one or two sections there was no rain during the week on the Pacific coast. The exceptionally cool weather of the past week was very unfavorable for most crops, and widespread injury was done by frosts, which have been general throughout the northern and

central portions of the country and as far south as the northern portions of Georgia, Alabama and Mississippi. The damage to the grape crop from frost has been especially heavy in New York and Pennsylvania, and fruits generally have suffered in all northern and central districts. Corn has suffered seriously. Cotton has also suffered.

*Week ending May 27.* — Throughout the United States generally the week was cooler than usual. Week decidedly cool on the Pacific coast and throughout the central and northern portions of the country east of the Rocky Mountains. Generally in the Gulf States and on the Atlantic coast south of New England the rainfall of the week exceeded the average. From the upper Ohio valley westward over the upper Mississippi and lower Missouri valleys the rainfall was decidedly below the average, and over a considerable portion of this area the rainfall was inappreciable. Upon the whole, the weather conditions of the week were unfavorable. Complaint as to the unfavorable effects of the unseasonably low temperature upon crops is general throughout the middle, central and southern portions. Cotton has suffered severely. Replanting of corn has been general.

### SPECIAL TELEGRAPHIC REPORTS.

WEATHER BUREAU, BOSTON.

*Week ending May 6.* — New England. Killing frost on the 2d, but nothing sufficiently advanced for injury; last of week very favorable, and farm work being hurried; planting general in southern and being begun in northern portion; grass starting well.

*Week ending May 13.* — New England. Hot and dry till 12th, and all vegetation made wonderful growth; no damage from cold weather on 13th, owing to cloudiness; general frost on 14th, except on immediate coast, which probably did considerable damage in interior counties.

*Week ending May 20.* — New England. Week very cold, and, except in extreme south-east portion, very dry; crops growing very slowly; frosts on 14th and 17th killed all crops above ground; all new growth on grapes frozen; strawberries badly injured; apples a little damaged, except in north-central portions; peaches injured very little.

*Week ending May 27.*—New England. Plenty of rain has fallen in south-east, but elsewhere it is too dry and cold for crops; grass feeling want of rain seriously and all crops coming slowly; considerable planting yet to be done, especially in the north.

## WEATHER SUMMARY FOR MAY, 1895.

FURNISHED BY THE NEW ENGLAND WEATHER SERVICE.

The month of May in Massachusetts was much warmer than is usual, the temperature range for the month was great and the daily changes large and rapid. At Westborough the mean temperature from the 6th to the 12th was  $73^{\circ}$ , while from the 12th to the 19th it was  $49^{\circ}$ . At Boston from the 6th to the 12th the excess in temperature averaged over  $18^{\circ}$  a day. For the month as a whole the mean was from  $1^{\circ}$  to  $3^{\circ}$  a day higher than the normal.

A sharp frost occurred in eastern sections on the morning of the 2d, the temperature falling several degrees below freezing. General and heavy frosts occurred on the 14th and 17th and local frosts on the 19th and 22d. Correspondents report great damage to the new growth on grapes, considerable to cranberry vines on bogs that were not flowed, and some injury to strawberries and the large fruits. Snow was seen on the tops of the Berkshire hills on the 15th.

The precipitation was considerably below the normal, except in the south-eastern counties, and was generally insufficient for the proper nourishment of crops. Grass especially has suffered in the central and western counties, and many correspondents report fear that the grass crop will be light, partly because of the drought last year. In the south-east grass is growing thick and fine and other crops are favorably affected by the weather. The rainfall was fairly well distributed throughout the month, and amounted to from one and one-half to two and one-half inches in all north-eastern, central and western counties, and from three and one-half to nearly five inches on the Cape and the Island of Nantucket. In western towns the springs and streams are reported to be the lowest for the season for many years.

There was more than the usual amount of sunshine and a marked absence of heavy rain and wind storms. On the

whole, the month was favorable for the forwarding of farm work, while the outlook for crops is encouraging. Dr. Jabez Fisher at Fitchburg reports apple bloom on the 12th, — three days later than in 1894, but eleven days earlier than the average for thirty-nine years.

In the circular to correspondents returnable May 31 the following questions were asked: —

1. How does the present season compare, agriculturally speaking, with last season?
2. What is the promise for pastures and mowings, and did fall seeding winter well?
3. How did the fruit bloom compare with the bloom of former years?
4. Did the frost of May 14 do much damage in your vicinity?
5. What insects appear to be doing the most damage in your neighborhood?
6. Is farm help scarce, or plenty; and what proportion would you call good help?
7. What wages, with board and without board, are paid farm help in your vicinity?
8. What percentage of cattle in your locality do you believe to be affected with tuberculosis? What percentage badly affected?

Returns have been received from 129 correspondents, and from them the following summary has been made: —

#### THE SEASON.

Correspondents vary so much in their replies to this question that it is difficult to make a fair summary. The following will help in forming an estimate: —

*Williamstown, Berkshire County.* — “Spring came in good. Short mud season and up to May 1 things were very forward. Need of rain soon felt, which did not come till May 27. The cold and drought, together with frosty nights for a week, caused vegetation to cease to grow. Rain has come now and the promise is very good.”

*Conway, Franklin County.* — “It has been an unusual season so far. The first of May was very warm, one day the

thermometer being at 90° in the shade; then it was very cold, and we had frosts and water froze. Hardly any rain until the 27th, when we had a fine rain with thunder showers. The 28th was very cool and windy, with indications of frost."

*Southampton, Hampshire County.* — "Season no better than last. The frost of May 14 and 17, with about two weeks of cold, dry wind, gave us long faces; but the rain of May 27 and the warm weather since caused a smile to come again."

*Templeton, Worcester County.* — "The winter was long. Spring opened late. A hot, dry spell the first week in May was followed by extreme cold from the 12th to the 23d; a freeze the 2d and 14th and quite a snow-storm the 15th. Now the season is quite favorable."

*Ipswich, Essex County.* — "Season generally much colder than last, and all vegetation from a week to ten days later."

*Dartmouth, Bristol County.* — "The season opened very favorably, but the last ten days having been cold and somewhat stormy have kept vegetable growth back."

*Sandwich, Barnstable County.* — "Season about as early as last, with more rain and a better outlook."

#### PASTURES AND MOWINGS.

Some mowings and pastures are in excellent condition, while many others are very poor. Old meadows and dry fields will produce but a very light crop of grass. The condition is perhaps less favorable in the western portion of the State, where drought has been more severe, and where considerable damage has been done by frosts. The correspondent in Monroe, Franklin County, writes, "Many acres are as brown as though fire ran over them." Fall seeding generally wintered well, although there are a number of complaints of winter-killing. In the eastern portion of the State the condition is generally satisfactory.

#### FRUIT BLOOM.

It being an off year for apples, the apple bloom was not generally heavy, particularly that of winter varieties. The bloom of pears, peaches, etc., was generally large. A num-

ber of correspondents speak of the fruit bloom as being abundant. It is feared the frosts the middle of May will materially shorten the fruit crop.

#### DAMAGE FROM FROST.

The frosts of May 14 and 17 were quite general, and considerable damage was done, especially on low lands. Grapes were greatly injured, and probably all fruit bloom was affected unfavorably. Grass was injured in the western counties. Gardens were injured, also corn, potatoes, asparagus, strawberries, beans, tomatoes, forest trees, and cranberries where not flowed. The correspondent in East Templeton, Worcester County, speaks of "quite a snow-storm the 15th (May)."

#### INSECTS.

The cold weather has not been conducive to the development of insect pests, and very little complaint of their ravages is made. Tent caterpillars do not appear to be particularly plenty or troublesome. Canker worms are reported as doing considerable damage in Middlesex and Essex counties. Other insects mentioned by correspondents are potato beetles, currant worms, cut worms, green lice, elm-tree borers, asparagus beetles, onion maggots, cabbage maggots and cranberry fire worms. Cut worms appear to be quite plenty.

#### FARM HELP AND WAGES.

Generally the supply of farm help is equal to the demand, but, as in many years past, the proportion of really good help is small. Some of the correspondents say that it is almost impossible to secure first-class help. Good help in the house is also very difficult to obtain. In Berkshire County the range in wages for farm help is \$10 to \$20 per month and board; by the day, help are paid \$1.25 to \$1.50, according to quality. In Franklin County the range is \$8 to \$25 per month and board; by the day, \$1 to \$1.50. In Hampshire County the range is \$12 to \$25 per month and board; by the day, \$1 to \$1.50. In Hampden County the range is \$10 to \$25 per month and board; by the day, \$1 to \$2. In Worcester County the range is \$8 to \$25 per month

and board; by the day, \$1 to \$2. In Middlesex County the range is \$15 to \$25 per month and board; by the day, \$1.50 to \$1.75. In Essex County the range is \$12 to \$25 per month and board; by the day, \$1 to \$1.50. In Norfolk County the range is \$15 to \$30 per month and board; by the day, \$1.50 to \$2. In Bristol County the range is \$10 to \$25 per month and board; by the day, \$1 to \$1.50. In Plymouth County the range is \$10 to \$22 per month and board; by the day, \$1.50. In Barnstable County the range is \$8 to \$25 per month and board; by the day, \$1.50 to \$2. In Dukes and Nantucket counties \$1.50 per day is paid. Twenty dollars per month and board or \$1.50 per day without board is probably a fair average of the wages paid good help.

#### TUBERCULOSIS.

The questions relative to this disease among our domestic animals were asked in order to learn the views and opinions of actual owners of cattle. Most of our correspondents are thoroughly familiar with the care and handling of live stock, and their replies to the questions asked show a commendable spirit of fairness and a desire to state the facts as they understand them. One hundred and twenty-nine replies were received. Many stated that they were unable to give an opinion which would be of value, owing to the impossibility of detecting the disease by physical examination, except when the cases are very marked. Thirty-eight correspondents replied that they believed their locality to be free from the disease. Quite a large number gave the number affected as 1 to 2 per cent. Others placed their estimate of number affected as high as 10, 20 and even 25 per cent. The majority of estimates of percentage of animals badly affected are 0, 1 and 2 per cent. None place it over 10 per cent. The estimates of course are largely in the nature of guess-work, and no one can predict accurately what would be shown were each animal to be tested with tuberculin. The following statements from returns of correspondents are in every way a fair presentation of the condition as reported to us in replies to the questions asked:—

*Berkshire County.*—1. With no tuberculin there is no tuberculosis. 2. Do not think many cattle are affected with



tuberculosis, as most of them are bred and raised here. Those found diseased are brought in. 3. In our immediate vicinity or town 1 in 500. Where Jerseys are largely kept by rich people, and delicately kept, perhaps 1 in 25.

*Franklin County.* — 1. Do not know what per cent are affected; think there are not many in this section, at any rate, do not know where they are. 2. Not more than 1 in 50; do not know one bad case. 3. I believe there is but very little about here, not over 5 per cent, and none badly affected that I know of. 4. I have no reason to believe there is very much in this vicinity; none has been found in cattle slaughtered the past year. 5. I doubt if 1 per cent in this locality. Have known of only one case badly affected. 6. About one-tenth of 1 per cent, and none badly affected.

*Hampshire County.* — 1. Affected as indicated by tuberculin, should expect at least 20 per cent; badly affected, as shown by physical signs, probably not 5 per cent. 2. Do not know of any badly affected. The authorities have killed three head, two of which had been lately brought into town. Do not think you would find much disease in the hill towns. 3. Our town inspector reports very few, and those so slight as to be even uncertain. 4. Tuberculosis has certainly been in this town. Two cows quarantined last year; one condemned and one released, but later died of tuberculosis. We are anxious about the future of this disease, and I think the fear of it has prevented the building of a number of silos in town this spring. 5. Cattle quite free from disease, only two or three cases reported in town by local inspector.

*Hampden County.* — 1. Don't know, but think only a small percentage, if our inspector can be relied upon. 2. Not being an expert, do not feel competent to answer intelligently, but do not believe there is any more tuberculosis now than thirty years ago, where stock is allowed free pasturage or given good, airy stables. 3. Any attempt at answering question 8 would be guess-work, and of no value and very likely misleading. I think very few suspected cases exist in this vicinity. The tendency in this section has been to dispose of those the owners were suspicious of. I have never yet seen the man who can correctly diagnose cases without the use of tuberculin. 4. I believe the per-

centage of tuberculous animals in this vicinity very small. Very few have been condemned by local inspection.

*Worcester County.*—1. With good care and common-sense treatment, don't think tuberculosis more common or more to be feared than for the last thirty years. Fancy farmers and some cow traders may have it, but think it troubles the common, every-day farmer but very little. The inspector here has found 3 diseased out of 300 dressed. 2. Being inspector of cattle for this town, can say that in my judgment there may be 8 per cent of the cows somewhat affected, but not more than 2 per cent that ought to be killed. 3. There are very few affected cattle in this town; in my judgment, not more than 2 per cent, and those not badly. 4. Our farmers are not willing to admit that any of their cattle are affected, but frequently speak of cases, so that I am led to the opinion that there is considerable of it among the cattle in town. 5. Notwithstanding the fact that some cattle have been "sold to the State" in this vicinity, there is no more evidence of tuberculosis among the herds here than there has been for ten years past, possibly 1 or 2 per cent. 6. Very few badly affected, but with the tuberculin test I think 20 per cent would respond. 7. I think the percentage of cattle in this locality quite small that are affected with tuberculosis. Don't know what the tuberculin test would reveal, but the badly affected ones are very few. 8. I think not over 2 per cent. There were three quarantined, but they were found not to have tuberculosis. Our inspector was a village man and never owned a cow, and don't think he knows what the disease is. Let us have inspectors who are familiar with cattle and let them use judgment, and there will not be half the present trouble. 9. I think if tested with tuberculin 25 per cent would be condemned, but probably 15 per cent of these would not show it by any physical examination, or their usefulness be hurt. 10. About 40 head of cattle have been killed here within two years. These were picked out in the first place by physical examination. 11. Our local inspector found during the year 15 tuberculous animals, which is 1.74 per cent of the number of cows and other neat stock assessed in 1894.

*Middlesex County.* — Nearly 200 cattle have been killed in this town. Tuberculin has proved efficient here. In a near-by town the local inspector has in some cases advised farmers to kill badly diseased cattle and bury them quietly, but no thorough examination of herds has been made. This is a curious commentary on the working of the law.

*Essex County.* — 1. There have been few herds examined in this vicinity, and there is nothing to judge by. 2. Do not know of any tuberculosis in town. Never knew of but two cases that appeared to be it. 3. Not posted, but think 1 per cent would be large. Know of but one condemned. 4. I have no reason to think there are many cattle affected, and believe very few are badly affected; 2 per cent would more than cover the whole.

*Norfolk County.* — 1. I know very little about what tuberculin would show if applied as a test. By external or physical examination there are no apparently bad cases. Judged in the same way (externally), there may be 1 to 5 per cent of suspicious cases, but not such that a man of ordinary prudence would hesitate to use the product of the cow. 2. I do not know of any cattle I believe affected with tuberculosis, and I think the scare is largely over.

*Bristol County.* — 1. Very few cattle are kept in this town. I have not heard of a single case of tuberculosis. 2. There are very few in this town that are affected at all, perhaps 5 per cent, and there are two cows which I think are badly affected. I hear of but few affected at this time, — not as many as in the winter months. 3. No tuberculosis in this section. Not a single animal has been condemned and killed by the commissioners. 4. Think there is but little, if any, in this neighborhood. Know of only two cases where cattle were condemned and killed, both proving perfectly healthy. 5. In two years but six cows in town slaughtered for beef have been found affected. I do not think tuberculosis is any more prevalent than it was fifty years ago. 6. I think very few cattle are affected with tuberculosis in this locality. I know of no cases at the present time. 7. Having had quite an experience as inspector of cattle, I do not think over 5 per cent are affected, and not over 1 per cent badly affected.

*Plymouth County.* — 1. As inspector, I found but two cases in the last two years. 2. The agent for this town says he does not know of any cattle affected with tuberculosis at the present time. 3. We do not hear much about tuberculosis in this section. 4. I do not know of one. Our inspector has only reported one, and that one has been reported twice. 5. The common farmer has no means of giving an intelligent answer. There are very few bad cases.

*Barnstable County.* — 1. I think the percentage very small. Can make no estimate. Know of no bad cases. 2. All cattle have been inspected and branded by the commissioners. Have heard of none being condemned. 3. I think the Cattle Commissioners found no diseased cattle in this vicinity.

*Dukes County.* — None.

*Nantucket County.* — Do not think there is 1 in 50. The use of tuberculin has been the worst curse that ever happened to our dairy farmers. I have had three good cows spoiled, and my neighbors are all having trouble with cows drying up. One man's herd of six has been dry four months. My best milch cow has been dry four and one-half months, and was never dry more than a month at a time before.

## NOTES OF CORRESPONDENTS.

(Returned to us May 31.)

## BERKSHIRE COUNTY.

*Sheffield* (DWIGHT ANDREWS). — Season about three weeks later than last. Promise good for pastures and mowings. Fall seeding did not winter well. Fruit bloom not as full as in former years. Frost of May 14 did considerable damage, especially to grapes. Tent caterpillar doing some damage. Farm help scarce and about one-fourth is good help. Wages \$20 per month with board and from \$25 to \$28 per month without board.

*Cheshire* (L. J. NORTON). — Season about an average. Pastures and mowings are looking fairly well, although it is too dry. Fruit bloom about an average. Early garden stuff and fruit trees where not sheltered were damaged by the frost of May 14. Tent caterpillars are very plenty. Farm help seems to be more plenty this year than usual. In this vicinity help get on an average about \$20 per month and board.

*Williamstown* (S. A. HICKOX). — This season compares favorably with last. Outlook for mowings and pastures poor until the welcome rain of May 27. Fall seeding wintered well. Fruit bloom was good. Frost of May 14 did not do much damage. Tent caterpillars are doing some damage. Farm help is plenty and about 10 per cent is good help. Wages \$10 to \$20 per month with board and \$25 per month without board.

## FRANKLIN COUNTY.

*Charlemont* (H. S. GILES). — The high temperature and sunshine of the first part of the month sent the season along rapidly, and all vegetation is ahead of the average. Fall seeding wintered well. Pastures are very good. Mowings appear quite well, but more rain is needed. The fruit bloom was below the average. Potato bugs are plenty. There is plenty of farm help and about three-fourths are good help. Wages for average help are \$18 per month with board and \$1.25 per day without board.

*Deerfield* (CHARLES JONES). — Weather has been dry and cold, with a few warm days. Grass looks well. Pastures are looking well. Fall seeding about an average. Rye and oats are looking well. Tobacco plants are a little late, but will be plenty. Farm help is fairly plenty and about one man in four is fairly good help. Wages from \$12 to \$19 per month with board and from \$1 to \$1.50 per day without board.

*Leverett* (W. L. BOUTWELL). — Season about as early as last year, but it is very dry, as we have had but one rain the past month, and that wet down only about three inches in grass land. Early fall seeding wintered well. Pastures look well now. Fruit bloom very full, but in some places it was damaged by frost. About one-fourth of the farm help is good help. Day help receive \$1.25. By the month \$18 to \$20 and board is paid.

#### HAMPSHIRE COUNTY.

*Chesterfield* (HORATIO BISBEE). — The frost and cold dry weather have kept vegetation back, and we are afraid the grass crop has been injured by frost. Fall seeding wintered well. Many trees in our forests are brown from the effects of the frost. Do not think the frost injured fruit trees. Farm help fairly plenty. Wages \$15 to \$20 per month with board and \$1.25 to \$1.50 by the day.

*Amherst* (WM. P. BROOKS). — Vegetation about equally advanced with last season. Pastures and mowings both started uncommonly well, except in patches where killed by drought last summer. Fall seeding wintered well, but condition is in many places poor on account of poor catch owing to dry season last year. Cherries, pears, peaches and quinces showed abundant fruit bloom. Apples showed abundant bloom in places, but irregular. Blackberries, currants and strawberries promise well, but raspberries rather poorly. The frost of May 14 did a little damage to beans and tender vegetables where up, and much to grapes in low places. Clover was hurt to some extent. Farm help plenty, but probably not more than one in ten is competent to drive and care for a team and do all kinds of work. Wages with board from \$14 per month up to \$25; without board, \$30 to \$40.

*Belchertown* (H. C. WEST). — Up to a few days the promise of both pastures and mowings was far from good, but the late rains have raised the hopes of the farmers. Fruit bloom a full average. Frost of May 14 badly injured fruits on low ground. No trouble as yet from insects. Good help is scarce. Wages \$15 to \$20 per month with board and \$1.25 to \$1.50 per day without board.

Our greatest drawback thus far has been in the extreme shortage of pasture. Dry and cold has been the general condition of the weather. The hay crop of last year was short, and we have had to buy feed in order to keep up the flow of milk of our cows.

#### HAMPDEN COUNTY.

*Westfield* (C. F. FOWLER). — Pastures are good, and grass has a good color, but is rather thin. Fall seeding wintered well. Fruit bloom a full average. Grapes and strawberries suffered by frost of May 14, and early vegetables of course were killed. Have noticed a few green lice upon cherry and plum trees and but few tent caterpillars. Good workers are fairly plenty, but intelligent workmen are scarce. Wages \$12 to \$20 per month with board and \$1.25 to \$1.50 per day without board.

*Holyoke* (JOHN C. THORPE). — The season is fully as early as last. Pastures and mowings were suffering for lack of rain, but are now looking well. Fall seeding wintered well. The bloom of apples was about one-half, Baldwins not more than one-third, other fruits an average bloom. The frost of May 14 did no damage on the east side of the meadows, but on the west side it killed vegetation. There is plenty of good farm help, and wages for that class are \$20 to \$25 per month and board, with \$14 to \$16 per month and board for the poorer help.

*Monson* (W. M. TUCKER). — Season much later than last, but the weather has been good the past two weeks. Pastures not yet recovered from last season's drought. Mowings look well where well cared for. Old fields and mowings are very poor. Fall seeding wintered well. Grapes were badly frozen by the frost of May 14. Currant worms and cut worms are doing some damage. Farm help is in fair supply and about one-half is good help. Wages \$18 to \$22 per month for eight months for the best help.

#### WORCESTER COUNTY.

*Petersham* (S. B. COOK). — Spring started in early, but the weather is very dry, as we have had no rain of consequence for three weeks. The promise for a good crop of hay is not good. Pastures are very dry. Fall seeding wintered fairly well. Apples, especially Baldwins, have less bloom than last year, and peaches and pears more. English grain is making slow growth, and nearly all the later-planted seeds are germinating slowly. The frost of May 14 did considerable damage in the valleys. Farm help is scarce and only one in five is good help. Wages are \$30 per month without board and \$16 to \$18 with board.

*Fitchburg* (Dr. JABEZ FISHER). — Season not quite as early as 1894, but earlier than the average for thirty-nine years. Pastures and mowings look well and everything wintered first class. Bloom of pears very full and that of apples less than one-half of last year. The frost of May 14 killed 25 to 40 per cent of the grapes and 10 to 20 per cent of the strawberries, all that had bloomed, but only little of the tree fruits. Good farm help fairly plenty and fully plenty of poor that are not earnest for work. Wages \$16 to \$22 per month with board and \$1.50 per day without.

*Worcester* (H. R. KINNEY). — The weather has been so changeable that many things are not looking as well as usual. It has not been favorable for grass. Fall seeding was very late and is small yet. Tree fruits, with the exception of the apple, bloomed full. The frost of May 14 cut some early vegetables. Cut worms are working some. There seems to be plenty of farm help and no more complaint than usual. Wages are \$18 to \$25 per month with board for fair to good help.

*Blackstone* (L. R. DANIELS). — Season quite favorable, excepting the fruit crops. Pastures are good and mowings promise well. Fall seeding wintered well. The apple bloom was quite profuse, except on Baldwin trees. The thermometer went down to 27° May 14, and everything in bloom was injured. Potato beetles are the only insects noticeable as yet. Farm help receive \$1 25 per day or \$15 per month with board and about \$1.50 per day and \$25 per month without board. Most of the help are French Canadians and live in villages.

*Warren* (W. E. PATRICK). — The season is about a week later than last, otherwise almost exactly the same. Under the most favorable conditions the grass crop will be light. Fall seeding wintered very well. Very light apple bloom, but above the average for peach, pear and cherry. The frost of May 14 was severe here, and on low land considerable damage was done. Better supply of farm help than for several years past and perhaps one-fourth is good help. Wages \$20 to \$25 per month with board and \$1.50 per day without board.

#### MIDDLESEX COUNTY.

*Sherborn* (N. B. DOUGLAS). — Season perhaps a trifle earlier than last. Pastures and mowings are looking well. Fall seeding looks uncommonly well. All fruit trees except Baldwin apples blossomed very full. The frost of May 14 did considerable damage. On some vineyards grapes are all killed. Early strawberries are spoiled, and some think late ones are injured. Canker worms are troubling some. Farm help is plenty and one-half of it



can be rated as good. Wages \$18 to \$20 per month with board and \$1.50 per day without.

*Billerica* (J. N. PARDEE). — Season about two weeks later than last for planting, otherwise compares favorably with last season. Pastures and mowings are very good and fall seeding wintered admirably. All fruits except winter apples have blossomed full. Early corn was cut off by the frost of May 14 and fruit was damaged to some extent. Some orchards are badly infested with canker worms. Farm help is plenty but good help is scarce. With board wages are \$8 to \$20 per month for the season, and without board \$30 to \$40 per month.

*Winchester* (MARSHALL SYMMES). — The start early in May was better than last year, but the frost has set things way back. Mowings and pastures are good. Fall seeding wintered well. The bloom was very heavy on all kinds of fruit trees. The frost of May 14 killed about half the beans and cut the potatoes down. Canker worms, tent caterpillars and especially cut worms are doing damage in this vicinity. Farm help is plenty and about 40 per cent is good help. Wages \$15 to \$20 per month with board and \$8 to \$10 per week without.

*Concord* (WM. H. HUNT). — We have had great extremes of heat and cold this season. Mowings are in good condition. The bloom of peaches, plums and grapes was full, but they are all killed by frost. Grapes were ruined by the frost of May 14, and strawberries very much injured. I have grown grapes for thirty years, and never lost a crop before from spring frosts. Canker worms are troubling some. Farm help is as abundant as usual and about one-half is good help. Wages are \$18 to \$25 per month and board.

#### ESSEX COUNTY.

*Newbury* (GEO. W. ADAMS). — Season later than last, but, agriculturally speaking, a better one than last. Pastures and mowings good and fall seeding wintered well. Fruit bloom below the average. The frost of May 14 did slight damage to many crops, but the damage can mostly be repaired. Canker worms and tent caterpillars are troubling some. Good farm help is scarce; 5 per cent honest and able-bodied; 5 per cent honest but old or infirm. Wages \$1.50 per day without board (dinner frequently added) and \$16 to \$25 per month with board.

*Marblehead* (WM. S. PHILLIPS, Jr). — Season is at least two weeks later than last. Pastures are now excellent. Grass is setting very thick. Fall seeding averages very well. Fruit bloom as heavy as last year. Frost of May 14 did no very serious

damage. Tent caterpillars and cut worms are doing some damage. Help is reasonably plenty, although fewer "hire-outs" are about this spring. Perhaps 60 per cent represents good and 10 per cent first-class help. Wages \$16 to \$20 and board for good and first-class help and \$1 50 per day without board.

*Ipswich* (O. C. SMITH). — Season generally much colder than last, and all vegetation is from a week to ten days later. Pastures are in good condition, and with sufficient rain hay promises an average crop. Apple bloom smaller than usual. Pear trees bloomed full and are setting much fruit. Tent caterpillars and canker worms are doing some damage. The winter killed grape vines where exposed to the winds. For the last week we have had fine growing weather. Good help is scarcer than medium and neither is plenty. Not more than 30 per cent is good help. Wages \$1.25 per day without board and from \$18 to \$20 per month with board.

#### NORFOLK COUNTY.

*Medfield* (GEO. R. CHASE). — Season backward. Grass looks well, but needs rain. Fall seeding wintered well. Apple bloom very full for the off year. By the frost of May 14 apples, pears and strawberries were injured and grapes ruined. Farm help very scarce and about one in ten good help. Wages are \$20 per month with board for ordinary help, \$25 to \$30 per month with board for a good teamster and farmer and \$1.75 to \$2 per day without board.

*Franklin* (C. M. ALLEN). — Grass roots went into winter quarters rather weak from last season's dry weather, and the consequence is grass will be thin, although it is now doing well. Fruit bloom about 90 per cent of an average. Cranberries were badly damaged and strawberries on low land one-half killed by the frost of May 14. Cut worms are doing considerable damage. Farm help is plenty and about 2 per cent is good help. Wages \$20 per month with board and \$1.50 per day without board.

*Norfolk* (A. J. WHITING). — Pastures and mowings promise well and fall seeding wintered well. No Baldwin trees blossomed; other varieties about an average in bloom. The frost of May 14 injured grape vines materially, and killed all garden truck above ground. Farm help equal to the demand and but a small proportion is good help. Wages \$15 to \$18 per month with board.

#### BRISTOL COUNTY.

*Raynham* (N. W. SHAW). — Season fully up to last season. Pastures are not as good as usual, and mowings were injured by the drought of last fall. Fall seeding did not come up in time,

and was injured some by the winter. The fruit bloom was equal to an average year. The frost of May 14 did damage in some places, but not as much as was anticipated. Currant and cut worms are doing some damage. Farm help very plenty and a greater proportion than usual is good help. Wages vary from \$25 to \$35 per month without board and \$12 to \$20 per month with board.

*Somerset* (JOSEPH GIBBS). — May has been the coldest May for many years, accompanied with unusual rainfall, which has caused potatoes to come up very uneven and some to rot. Grass promises a full hay crop. Apples promise a light crop. Strawberries promise a good crop. Season two weeks later than last. Fruit bloom 50 per cent less than usual. Very little damage from frost. Caterpillars and canker worms doing the most damage. Farm help is not plenty and one-third is good help. Wages from \$14 to \$25 per month with board.

*Fairhaven* (F. C. LYON). — The present season is more favorable for all crops than last. The promise for mowings never was better. Fall seeding did not winter well. On the whole, the fruit bloom was a fair average. The frost of May 14 did little damage except to cut down what potatoes were up. Farm help is plenty and about one-half we call good help. Wages are \$1.50 per day without board and \$15 per month with board.

#### PLYMOUTH COUNTY.

*Middleborough* (ELBRIDGE CUSHMAN). — Season very favorable. Grass is good. Fall seeding did not winter well. Apple bloom not as full, especially that of Baldwins. The bloom of Greening apples, pears and cherries was good. Frost of May 14 did very little damage. Tent caterpillars are doing some damage. Farm help plenty. Wages \$30 per month and rent or \$20 per month and board.

*West Bridgewater* (F. E. HOWARD). — Season compares favorably with last, but is several days later. Grass is looking unusually well, and is forward and well set. The fruit bloom was not as large as in some years, especially that of apples. Currant worms are doing some damage. The damage from frost has not proved as serious as was anticipated. Farm help is plenty, with about an even chance of getting a good man. It is much more difficult to get a good girl to do housework. Wages of farm help about \$20 per month with board and \$35 to \$40 per month without board. Wages \$3 per week and board for girls for housework.

*Kingston* (J. H. CUSHMAN). — Season about averages with last. Pastures are looking fine; mowing never looked better. There

was a very fair fruit bloom for the odd year. Frost of May 14 damaged gardens about one-half. The potato beetle is troubling us some. Farm help is plenty and about one in five is good help. Wages \$25 to \$35 per month without board. None are hired with board.

#### BARNSTABLE COUNTY.

*Dennis* (JOSHUA CROWELL). — Season compares favorably with last. The outlook for grass is very much ahead of last season. Newly seeded land is looking well. Fruit bloom not quite up to the average. The frost of May 14 did not do much damage. Tent caterpillars and cranberry-vine worms are working in some localities. Farm help equal to the demand and one-half is good help. Wages \$20 to \$25 per month with board and \$30 to \$35 without board. Cranberries are not promising well, owing to last season's drought, winter-killing of vines and frost in some localities.

*Barnstable* (JOHN BURSLEY). — Season a few days later than last. Pastures and old mowings were badly injured by the drought of last year. Fall seeding wintered well. Fruit bloom a full average. Frost of May 14 did not do so much damage as the one on May 1. Tent caterpillars and cranberry fire worms are doing some damage. Farm help not very plenty and about one in three is good help. Wages \$15 to \$20 per month with board and 15 to 17 cents per hour without board.

#### DUKES COUNTY.

*West Tisbury* (GEO. HUNT LUCE). — Season much more favorable than last. Pastures and mowings promise well. Fruit bloom about the same as last year. The frost of May 14 did no damage. No insects are troubling us at present. Farm help about equal to the demand and one person in ten is good help. Wages \$1.50 per day without board.

#### NANTUCKET COUNTY.

*Nantucket* (C. W. GARDNER). — Season more rainy than last, but is cold. The promise for grass is very good. The frost of May 14 did scarcely any damage. The potato beetle is troubling us some. Good help is scarce and one person in ten is of that character. Wages \$10 to \$25 per month with board and \$1.50 per day without board.

BULLETIN OF  
MASSACHUSETTS BOARD OF AGRICULTURE.

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VETERINARY.

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TUBERCULIN. — WHAT IT IS; HOW IT IS USED; WHAT IT DOES.

*What it is.*

Tuberculin is the sterilized and filtered glycerine extract of the bacillus tuberculosis. It contains an active principle, chemically complex in its composition, which is produced by the functional activity of the germ.

The first step in its preparation is the cultivation in the laboratory upon suitable nutrient material of large numbers of the germs. These by their growth produce the active principle. The culture is then treated with glycerine, filtered through porcelain to remove the living germs, after which it is sterilized by being subjected to the action of a high temperature. To make it more concentrated, a part of the fluid is evaporated at a low temperature, and carbolic acid added as a preservative.

By the process of filtration and sterilization all germs in the culture are either removed or destroyed, while the product of their growth remains active in the tuberculin.

As the active principle is not living matter, and can in no way produce such, the injection of tuberculin into the system of a healthy animal cannot by any possible means give rise to the disease tuberculosis.

*How it is used.*

To be accurate, the temperature of the animal to be tested should be taken several times, at intervals of two or three hours, during the day, by inserting into the rectum an ordinary fever thermometer. The last reading should be taken late in the afternoon or during early evening. The several readings are for the purpose of finding the normal temperature previous to the employment of the tuberculin. Ordinarily, with animals under normal conditions, it is hardly necessary to take more than two or three readings, the last of which should be made just before the tuberculin is used. A careful record of all temperatures should be kept, and should any be found higher than normal, the testing

should be postponed until the temperature has returned to its normal. This varies in different animals within comparatively narrow limits under varying conditions, but should never as a rule be above 102° or 102.5° F.

Having obtained the normal temperature of the animal, the tuberculin should be prepared for use. When it is purchased in the concentrated form it should be diluted, one part of tuberculin being added to nine parts of a 1 per cent solution of carbolic acid, prepared with distilled water. By some manufacturers it is diluted before being sold; in such cases it is to be used in the form in which it is purchased.

To prepare the animal for the injection of the tuberculin, the hair should be clipped from a part of the skin as large as a silver dollar, on the neck, brisket, on the part of the side just back of the elbow or at a point just back of the scapula, midway between the backbone and the point of the elbow. This area should then be thoroughly cleansed with a 5 per cent solution of carbolic acid. A strong hypodermic syringe, with a capacity of about 2½ cubic centimeters, thoroughly cleaned by being filled and emptied several times with a 5 per cent solution of carbolic acid or some other equally good antiseptic, should be filled with the dilute solution of tuberculin. A whole or a part of the contents of the syringe may then be injected under the skin of that portion of the body previously prepared for its introduction.

After removal of the needle, a few light strokes with the fingers upon the part will serve to spread the fluid evenly about under the skin. Care should be taken not to inject any air with the solution. This can be easily avoided by holding the syringe, after it has been filled, needle end up, when the bubble of air will rise to the top of the column of fluid and can then be forced out by pressing upon the piston until the solution appears at the point of the needle.

The quantity of tuberculin to be used depends upon condition, and varies from 1 to 3 cubic centimeters of the 10 per cent mixture. The dose for an average-sized cow is about 2.5 cubic centimeters, while 1 cubic centimeter would be sufficient for a yearling.

If the animal is suspected of being tuberculous on account of unthriftiness and emaciation, a comparatively large quantity should be used, as it has been found in many cases that animals in the advanced stages of tuberculosis do not respond to the test as readily as those in the early stages.

It is best to administer the tuberculin during the latter part of the day, when the temperature is normally highest. After it is used the animal should be kept as quiet as possible in the stable



While these two examples show what the action of tuberculin usually is in case of healthy and tuberculous animals, unfortunately the difference is not always so well marked, and with but a slight elevation of the temperature in either healthy or diseased, it sometimes becomes impossible to say from the variations whether an animal is the subject of the disease or not. In all instances where there is a decided rise of the temperature after tuberculin has been used, it becomes necessary, in order to make a diagnosis of tuberculosis, to exclude all other possible causes of a rise, — such as acute inflammation in any part of the body, excitement, excessive heat, etc. For this reason tuberculin is most valuable in the hands of those who are thoroughly conversant with the various diseases of cattle.

The use of tuberculin does not give any information as to the extent of the development or the rapidity of the progress of tuberculosis in cattle. It has been found that the reaction is fully as great in those animals in which there are but one or two small inert tuberculous nodules no larger than a buck shot as it is when there are extensive and active lesions. Consequently, in order to prove the accuracy of the tuberculin test, it becomes necessary to make a thorough examination in all autopsies, to detect the minutest nodules that may be present. In many cases this requires prolonged search and a knowledge of the gross and microscopical appearances of tuberculous tissue.

Following there appear the conclusions drawn from a series of experiments made with tuberculin at the Massachusetts Agricultural College. These are taken from Bulletin No. 27 of the Hatch Experiment Station, a few copies of which are still in the hands of the director for distribution.

1. That it is unsafe to purchase animals to add to a healthy herd from a herd in which tuberculosis has existed.

2. That poor sanitary surroundings, especially imperfect ventilation and insufficient light, are favorable to the rapid spread of tuberculosis among cattle.

3. That it is much better to dispose of excrement outside of stables than in cellars underneath them.

4. That mangers and other stable fixtures which increase the amount of surface, cracks and corners that cannot be easily cleaned are objectionable, from the fact that when the germs of tuberculosis become scattered, under such conditions they are not easily destroyed by the use of disinfecting fluids.

5. That infected stables bear close relation to the propagation of the disease.



6. That even by the use of strong disinfecting fluids it is very difficult if not impossible to rid an old stable of the germs of tuberculosis.

7. That the diagnosis in most cases of this disease by physical examination is impossible.

8. That in tuberculin we have an exceedingly delicate and reliable test for tuberculosis.

9. That tuberculin indicates the existence of tuberculosis in the lungs and other parts of the body when objective symptoms are absent, and when no germs can be discovered by microscopical examination of the mucus from the nostrils.

10. That its use is not followed by any ill effects of a serious or permanent nature.

11. That in some instances the injection of tuberculin produces a marked rise of the internal temperature when no tuberculosis exists.

12. That in some cases when tubercles are present in the body its injection is not followed by a well-defined reaction.

13. That the reaction following the use of tuberculin bears no relation to the extent or development of the disease.

14. That it is impossible to formulate a rule by which we can say that certain variations of the temperature may or may not indicate the presence of tubercles.

15. That in tuberculin we have the only means by which we can eradicate tuberculosis from among our cattle.

16. That our old-style and unsanitary stables, thoroughly infected with the germs of tuberculosis, make the complete eradication and suppression of this disease well-nigh impossible.

JAS. B. PAIGE,  
*Veterinarian.*



SERIES OF 1895.

BULLETIN No. 2.

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# MASSACHUSETTS CROP REPORT

FOR THE

MONTH OF JUNE, 1895.

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ISSUED BY

WM. R. SESSIONS,  
SECRETARY STATE BOARD OF AGRICULTURE.

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# CROP REPORT FOR THE MONTH OF JUNE, 1895.

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OFFICE OF STATE BOARD OF AGRICULTURE,  
BOSTON, MASS., July 1, 1895.

Bulletin No. 2, Crop Report for the month of June, is herewith presented. Particular attention is called to an article at the end, on drainage, by the engineer of this Board.

## PROGRESS OF THE SEASON.

Report No. 127 (June, 1895) of the Statistician of the United States Department of Agriculture makes the acreage of winter wheat now growing, after allowing for abandonments, 96.1 per cent of the area harvested in 1894. Condition has fallen decidedly since the last report, being 71.1 per cent, against 82.9 on May 1. The falling off is due to the marked fluctuations of temperature during May and to deficiency of rainfall in some States. The condition of spring wheat shows an average for the whole country of 97.8 per cent.

The preliminary report places the acreage of oats at 103.2 of last year's area, and the condition at 84.3, against 87 last June. Acreage of barley 104 per cent of last year's breadth, and condition 90.3 per cent, against 82.2 last year. Acreage of rye 96.7 of that of last year; average condition June 1, 85.7 per cent. Acreage of rice 100.2 per cent of that of last year, and condition 89.2.

The area of clover is considerably reduced, compared with last year, being only 92.5, while the general average of condition is only 82.8, a lower figure than any for the last decade. Both the reduction of area and the low average of condition are chiefly found in the region bordering the great lakes and the northern half of the Mississippi valley. In the States which show a largely reduced area the fact is in most cases attributable to the effects of the great drought of 1894,

followed by a severe winter, especially where there was a deficiency of protection from snow. To the same cause is largely due the lowness of condition, though spring frosts, protracted cold weather and recent drought have also contributed to the same result.

The general average condition of spring pastures is 88.1, a reduction of 1.6 points since May 1. It is in fact the lowest figure recorded in a number of years. In the States along the Atlantic and Gulf coasts the average is generally high, the lowest averages being found chiefly in the States bordering on the great lakes, in those of the Ohio valley, and in Iowa, Missouri, Kansas, Nebraska and Oklahoma. Drought, frosts, and in some localities ravages of cut worms and other insects, are among the most prevalent causes of reduced condition.

The general condition of apples June 1 is higher than on the same date in 1894, although in many of the Northern States the percentages are low. The frosts of May have done much damage, although, as is usually the case, orchards in favored situations, even in districts suffering most, have apparently escaped injury.

The first report of the season relative to the condition of the peach crop is decidedly more favorable than that received in June, 1894. But two States of primary importance have a low condition, namely, Ohio, 22 per cent, and Michigan, 50 per cent, while Maryland is the only remaining State with a percentage less than 70, the condition there being 63.

The average acreage of cotton for the United States is 85.2, a reduction of 14.8 per cent upon the revised acreage for 1894, given out in May. The general average condition for the country is 81.

## TEMPERATURE AND RAINFALL FOR THE WHOLE COUNTRY.

FROM UNITED STATES WEATHER-CROP BULLETINS.

*Week ending June 3.* — Week remarkably warm over the central and eastern portions of the country, and decidedly cool over the Rocky Mountain and plateau regions and on the Pacific coast. Week slightly cooler than usual on the Texas coast. From the Gulf coast northward over the east-

ern Rocky Mountain slope and from the upper Missouri valley eastward to Lake Michigan the rainfall exceeded the average, and over the western portions of the Dakotas, Nebraska and Kansas the actual fall was exceptionally heavy. Except in limited sections the rainfall elsewhere was below the average. Weather favorable for corn and cotton. Winter wheat not particularly promising, except in Oregon.

*Week ending June 10.* — Week warmer than usual in the upper Mississippi and lower Ohio valleys, Lake region and on the Pacific coast. Week cooler than usual over northern portion of western half of the cotton region, and over the central and northern Rocky Mountain and plateau regions, including the upper Missouri valley. Rainfall of week excessive over the greater portion of the central Gulf States; also over eastern Kansas, central Iowa and from western Montana eastward over North Dakota and Minnesota, including the spring wheat region. Week more favorable to agriculture than any week of the season since the period from May 1-7. Corn has made good growth during the week and is generally in promising condition. Light frosts occurred in New England on the 8th. Killing frosts occurred in Minnesota and Idaho, causing injury to gardens.

*Week ending June 17.* — Week averaged warmer than usual over central Texas and the northern districts from the upper Mississippi valley eastward to the New England coast. On the Atlantic coast south of New Jersey and over the central and eastern portions of the Gulf States the week averaged slightly cooler than usual; also over the States of the eastern Rocky Mountain slope and thence westward to the Pacific coast. Generally throughout the Gulf States the rainfall of the week was exceptionally heavy. In New England, the Lake region, Ohio valley and over the greater part of the upper Mississippi valley the rainfall was less than usual, there being an entire absence of rain in the central Ohio valley and on the southern New England coast, with but light showers in the lower Lake region. Week generally favorable to crops, although drought is becoming serious in some sections. Harvesting of winter wheat has become general. Outlook for spring wheat generally excellent. Corn, cotton and tobacco are doing well. Heavy frost in

south-eastern Oregon, and frosts also damaged fruit and vegetables in Idaho, Montana and Utah.

*Week ending June 24.* — From the upper Mississippi valley eastward to the middle Atlantic and southern New England coasts the week was warmer than usual. Also warmer than usual in north-eastern Kansas, California and western portions of middle and northern plateau region. Generally from the Mississippi westward to the Rocky Mountains week averaged cooler than usual. In central and western portions of the cotton region and portions of the Carolinas the rainfall was in excess, and over portions of Texas and Arkansas the fall was very heavy. More than the usual amount in other limited areas. In New England and middle Atlantic States, the central Mississippi valley, the Lake region, portions of the east Gulf States and Tennessee and the Rocky Mountain regions rainfall was less than usual. Practically no rain over portions of the middle Atlantic States and southern New England. Week generally favorable for crops, and drought was relieved in many sections. Harvesting of winter wheat has continued, and is now general over the wheat belt. Spring wheat is now beginning to head. Corn has made a good growth. Cotton was injured by heavy rains in central and western portions. Oat harvest begun in Southern States, and reports generally favorable. Tobacco planting about completed. A heavy frost occurred in Utah on the 18th.

## SPECIAL TELEGRAPHIC REPORTS.

WEATHER BUREAU, BOSTON.

*Week ending June 3.* — New England. Too dry in most places for the best development of field crops, and grass is suffering; planting about completed, and hoeing in progress; fruit prospects splendid in southern portion, but less encouraging in northern portion.

*Week ending June 10.* — New England. Light general rains first of week helped all crops wonderfully, and they are now advancing rapidly except where retarded by cool nights; light frosts, but no damage; hoeing in progress; tobacco setting well under way, with favorable conditions.



*Week ending June 17.*—New England. Showers and warm weather in northern portion, and crops are growing fast; too dry in southern portion, especially for grass, which is promising small yield; haying begun, as upland fields have ripened prematurely and are very light; insect pests numerous.

*Week ending June 24.*—New England. The past week, on the whole, has been good for all growing crops, but rain is needed; haying begun and some hoeing done; oats, rye and corn doing well; potato bugs doing some damage; some tobacco had to be set over on account of cut worms; fruit promises a fair yield.

### WEATHER SUMMARY FOR JUNE.

FURNISHED BY THE NEW ENGLAND WEATHER SERVICE.

Notwithstanding the drought which prevailed in Massachusetts during the middle of June, the month of July has opened very favorably for all agricultural interests, and most field crops are up with or ahead of the average. In northern counties occasional showers fell during the month, and the top of the ground was moist enough for most purposes; but in all central and southern districts not more than a trace of rain came from the 6th to the 25th, and the ground got very dry. Grass especially suffered and ripened prematurely, crowding haying fast on to hoeing. On the Cape most field crops were backward and growing slowly; but the cloudy, wet weather of the last week changed the aspect of everything. Even grass, except on the driest knolls, has thickened up very much, and is now growing with new energy. The grass on fields that had been cut is starting quickly, and shows prospect of a good second crop. At most places the total rainfall for the month was slightly below the normal.

A hail storm in the vicinity of Warren, in Worcester County, on the 23d, did considerable damage. Mr. W. H. Warren of that place reports that some corn and potato fields were ruined, and have been planted over. Orchards were stripped of leaves and fruit, and in some cases the bark was torn from the trees. One farmer had one hundred

and seventy-five panes of glass broken, and another seventy. Fields of grass and grain were laid flat, and gardens destroyed. Some of the hailstones were as large as hen's eggs. At Blandford, in Hampden County, a severe hail storm occurred in a limited strip on the 25th, cutting down and almost destroying all crops. A high wind accompanied the thunderstorm on the 29th, near Leeds, in Hampshire County, and did some damage to heavy grass, potatoes and corn.

The temperature was slightly above the normal for the month in eastern districts, and considerably so in central. The warmest day at most places was on the 2d.

Most correspondents report a marked scarcity of the insect-eating birds, such as the bluebird, phoebe, robin and thrush; while the seed-eating birds, like the warblers, flycatchers, sparrows, etc., are nearly as plenty as usual. The scarcity of the first-named birds is probably due to the severe cold in the southern part of the United States last winter, as most of those birds winter there. Not only were the birds probably killed, but many insects that they feed on were also destroyed. Their absence from our fields and gardens will probably result in a marked increase in the insect pests here, which will be more noticeable next season than this.

In the circular to correspondents returnable June 25 the following questions were asked:—

1. What insects are doing the most damage in your locality?
2. How is Indian corn looking, and what is the acreage, as compared with previous years?
3. How is haying progressing, and what is the prospect for the crop?
4. How does the acreage of early potatoes compare with previous years, and do they promise a full average crop?
5. How have early market-garden crops compared in yield and price with former years, and what is the prospect for those not yet harvested?
6. How do dairy products compare in yield and price with last year, and what is the condition of dairy stock as regards health?
7. What is the condition of pasturage in your vicinity?

8. What is the outlook for such fruits and berries as are grown for market in your locality, naming them?

Returns were received from 108 correspondents, and from these the following summary has been made : \* —

#### INSECTS.

Among insects the potato beetle and the cut worms appear to be causing the most trouble, although the former insect is not more prevalent than usual. Cut worms appear to be unusually numerous. In the Connecticut valley they have committed serious depredations in tobacco and onion fields. The canker worm has also done considerable damage in some localities. Other insects mentioned by correspondents are squash bugs, wire worms, grasshoppers, cabbage maggots, onion maggots, rose bugs, the pear tree psylla, the codlin moth, spittle insects, asparagus beetles, currant worms, tent caterpillars, fire worms and the Hessian fly. Only one correspondent reported the presence of the horn fly.

#### INDIAN CORN.

Indian corn has stood the dry weather better than most crops, and is generally reported as looking well, though some correspondents qualify this statement by speaking of it as backward. Stand and color are generally reported good. There seems to be quite a general increase in acreage throughout the State, fully one-third of the correspondents reporting an increase, and all but two of the remainder speaking of the acreage as average. Some put the increase as high as one-fourth, while others speak of it as slight.

#### THE HAY CROP.

At the time of making returns haying was generally begun all over the State, with the exception of Berkshire County, although some few reported it as not yet commenced. Most spoke of it as just beginning and very few as well advanced. The crop will be light in almost all sections, only nine correspondents speaking of the crop as either good or average. Most speak of it as either light or very light, while some few report only half a crop.

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\* Since these returns were received rain has been general over the State. Much hay injured in the field.

### EARLY POTATOES.

The acreage of early potatoes remains about the same as for the last few years. On the whole, a slight increase may be noted, as quite a number of correspondents report an increase in acreage and only a few report a decrease. The crop at time of making returns was looking well in most sections, though badly in need of rain.

### MARKET-GARDEN CROPS.

Early market-garden crops seem to have generally been slightly below the average in both yield and price, though the decrease in each case has been but slight. Probably the cold weather of the early spring had much to do with the smaller yields obtained. Very few returns were received as to the condition of late crops.

### DAIRY PRODUCTS.

The quantity of dairy products appears to be average, but enough reports of decreased prices have been received to warrant the statement that there has been a slight but general decrease in the prices received for all dairy products. The condition and health of stock are spoken of as good, only one correspondent speaking of cattle as thin in flesh.

### PASTURAGE.

Hardly one-fourth of the correspondents speak of pasturage as good, or even fair; the remainder report that pastures are either short or dry or are rapidly drying up. A few speak of cattle being sold already in anticipation of a scarcity of feed.

### FRUITS AND BERRIES.

The late frosts injured all fruits and berries. Strawberries were a light crop, owing to injuries from frost and drought. Blackberries and raspberries will generally be light crops, currants a fair crop and cherries good. A number of correspondents speak of the peach crop as an entire or partial failure. Plums and pears will be light, though some report pears as doing well. Apples will be a very light crop in most sections. Cranberries promise a fair average crop. Wild berries are generally looking well.

## NOTES OF CORRESPONDENTS.

(Returned to us June 25.)

## BERKSHIRE COUNTY.

*Sheffield* (DWIGHT ANDREWS). — Potato bugs and cut worms are most prevalent. Corn is looking very good, with an average acreage. Very little haying done as yet; prospect of a light crop. More early potatoes were planted than usual, and they promise a full average crop. Early market-garden crops about average in yield and price, and the prospect for later ones very good. Dairy products about as last year in quantity and price, and stock is looking good. Pastures are getting dry. Strawberries very good, raspberries fair, not many currants, cherries poor; on an average, fruit not as good as in former years.

*Egremont* (J. H. ROWLEY). — Potato bugs are doing some damage. Indian corn looking well; acreage larger than in previous years. Haying not commenced; crop will not exceed 75 per cent of average. Acreage of early potatoes about the same as in former years; rain needed, or the crop will be below average. Quantity of dairy products fully up, with prices average; health of stock good. Pastures are suffering badly from the drought. Strawberries injured by drought; other fruits and berries looking fairly well.

*Lee* (A. BRADLEY). — Corn looking finely, with the usual acreage. Haying not commenced; light crop. Early potatoes a little below average condition. Quantity and prices of dairy products fully up to last year; health of stock good. Pasturage very short, on account of dry weather. Strawberries a fair crop. Oats and rye are looking finely.

*Richmond* (T. B. SALMON). — No insects except potato bugs. Corn very fine, with acreage about the same as in previous years. Haying not yet begun; crop good. Very few early potatoes planted, but these promise a full average crop. Not as many cows kept this year as last; prices of dairy products average; health of stock good. Pasturage in very good condition. Pears badly hurt by frost; no cherries; strawberries a small yield; rasp-

berries looking finely; blackberries looking well; currants very good in some places, though injured by frost in some others.

*Hancock* (C. H. WELLS). — Potato bugs and squash bugs are doing some damage. Most pieces of corn are looking finely; acreage about as usual. Haying not yet commenced; prospect for a light crop. Potatoes are looking well. Quantity and price of dairy products about as last year; no disease among cattle. Pasturage in very good condition. Strawberries a fair crop, pears and apples not plenty, a good crop of cherries and currants, very few plums.

*Hinsdale* (S. M. RAYMOND). — Potato bugs are doing some damage. Corn is looking well; acreage increased over the past few years. Haying not yet commenced; without rain, soon shall a half crop. Early potatoes compare well with previous years, and look well. Dairy products about the same in quantity and price as last year; butter 2 cents per pound higher; stock in good health. Pasturage looks well, but will soon be dry without rain. Strawberries are good, price 12 cents; blackberries and raspberries looking well; apples and pears a fair crop. Rain is very much needed.

#### FRANKLIN COUNTY.

*Charlemont* (H. S. GILES). — Potato bugs are at work in large numbers. Corn is looking fairly well; acreage a full average. Haying has commenced; very little hay on dry land. Early potatoes promise a full average crop, with about the usual acreage. Early market-garden crops compare favorably with last year. Dairy products about as last year in quantity and price; health of stock good. Pasturage is fairly good. There is a good crop of strawberries; prices lower than previous years.

*Colrain* (A. A. SMITH). — Potato bugs are doing some damage. Corn in A No. 1 condition; 10 per cent increase in acreage. Haying progressing slowly; about a two-thirds crop. Acreage of early potatoes about the same as in previous years; crop promises well. Milk and butter are a little off in yield and price; stock in usual condition. Pastures are getting dry. Strawberries are a good crop.

*Northfield* (B. F. FIELD). — Potato bugs are doing some damage. Indian corn is looking well for this time of year; acreage about the same as last year. Just commenced haying; the crop will be light. Acreage of early potatoes about one-third larger than last year, with the promise of a good average crop. Dairy stock is in good health; price of butter fully 2 cents lower than

last year. Pastures are in poor condition, owing to the dry weather. Strawberries a light yield, perhaps not half that of last year.

*Orange* (ANSEL HARRINGTON). — Cut worms and potato bugs are very troublesome. Corn looking finely; acreage about the same as previous years. Haying just commencing; prospect that the crop will be light. Acreage of early potatoes about as in previous years; crop looking fairly well. Yield and price of market-garden crops a little below former years; prospect not very good for those not harvested. Quantity and price of dairy products about the same as last year; health of stock good. Pastures are a little short for this season of the year. Most kinds of fruit were badly damaged by frost. Strawberries below the average; raspberries and blueberries promise fairly well.

*Whately* (FRANK DICKINSON). — Wire worms and cut worms are doing the most damage. Corn is looking well; acreage larger than in previous years. Haying just begun; very light crop. More potatoes planted than in former years; looking finely. Yield for early market-garden crops light, price medium, prospect for late crops fair. Quantity of dairy products large, price low; stock in average health. Pastures are very dry and short. Apples a short crop, pears above the average.

*Ashfield* (CHARLES HOWES). — Grasshoppers are getting thick on high land. Corn is looking well, with a larger acreage than usual; some farmers are putting in silos. Haying is commencing, and on most land the crop is very light. About the usual acreage of early potatoes, with promise of a light crop. Gardens are looking quite well. About the usual quantity of dairy products; cream lower in price and butter about 2 cents per pound lower; stock in good health. Pastures are beginning to feel the dry weather, and feed is getting short. Strawberries a good crop, but the season has been short; red raspberries promise a good crop.

#### HAMPSHIRE COUNTY.

*Worthington* (C. K. BREWSTER). — Indian corn fully equal to former years in acreage, and looking well. The hay crop is not more than two-thirds of an average. Early potatoes an average acreage, and looking fairly well. No market-garden crops yet harvested; prospect fair. Quantity and price of dairy products about the same as last year; condition of stock good. Pastures are feeling the dry season, and must be short unless there is rain soon. Strawberries are fine and plenty.

*Chesterfield* (HORATIO BISBEE). — Potato bugs are doing some damage. Corn is looking finely, with acreage fully up. Haying has not yet commenced; crop very poor. Early potatoes fully up to previous years. Quantity of dairy products about the same as usual; prices a little lower; cows all right. Pasturage in poor condition from the drought both of last year and the present season. More fodder corn is raised than in former years, with each year a silo or two put in.

*Southampton* (C. B. LYMAN). — Potato bugs and cut worms are doing some damage. Corn looking first rate; acreage rather larger than usual. Not much haying done; prospect for a light crop. About the usual acreage of early potatoes, which are looking well. Early market-garden crops about average; prospect for later ones not good, unless we have rain soon. Quality of dairy products good; prices low; stock in good health. Pastures need rain, and feed does not grow.

*Northampton* (D. A. HORTON). — Corn is looking well; acreage increased over last year. Not much haying done yet, and the crop will be less than average. Acreage of early potatoes fully as great as last year, and looking well. Market-garden crops have all been good, and the prospect is good. Dairy products about as last year in quantity, but prices are lower. Pasturage is in very good condition. Strawberries have been more than an average crop, with other berries looking well.

*Amherst* (WM. P. BROOKS). — Cut worms have been extraordinarily injurious to tobacco and onions and in gardens. Corn rather backward; acreage about as last year. Haying hardly begun by most farmers; crop very poor on dry fields, elsewhere good. Acreage of early potatoes rather larger than usual, and appearance generally good. Market-garden crops generally look well. Quantity of dairy products about as last year; price of butter low; health of stock good. Pasturage getting very short on hill and dry pastures. Strawberries good, but season short; prices low; blackberries good; raspberries poor; currants good; peaches a heavy crop; apples promise well on many trees, but many others are without fruit; cherries never better. Have had no rain worth mentioning since June 6.

*Greenwich* (WM. S. DOUGLAS). — Potato bugs are doing some damage. Indian corn is looking quite well. The hay crop is very light. Quite as many early potatoes as usual planted. Early market-garden crops about the same as in former years. Most of our cream goes to the creamery; stock in good health. The dry weather has shortened the pastures. Fruits and berries will be a light crop.



## HAMPDEN COUNTY.

*Blandford* (E. W. BOISE). — Potato beetles very plenty; other insects not as numerous as usual. Indian corn an average stand; more planted than usual. Very little haying done yet; shortage of full 25 per cent in the crop. Fully as many early potatoes planted as usual. Dairy products less in quantity and price than last year; stock usually healthy. Pasturage in bad condition, short from May frosts and dry weather. Already many are offering stock for sale, in anticipation of having to feed from the barn. Late-planted crops are making a remarkable growth. Prospect good for the apple crop, and wild berries promise well.

*Tolland* (E. M. MOORE). — Potato bugs and cut worms are doing some damage. Corn is looking fairly well; acreage about as in previous years. No grass cut yet; crop will be very light. Acreage of early potatoes larger than in previous years; crop will be short without rain soon. Quantity of dairy products not as large as last year; prices about the same; stock in healthy condition. Feed getting very short in pastures. One-fourth crop of apples, and the berry crop less than average. People are reducing their number of stock, expecting a very light crop of hay.

*Aquawam* (R. DEWITT). — The potato bug and the cut worm are doing some damage. Corn is looking well, and has not yet suffered from drought; acreage one-fourth larger than last year. Acreage of early potatoes larger than usual, but not looking well, owing to drought and bad seed. Strawberries a smaller crop than usual, and blackberries mostly a failure.

*West Springfield* (J. N. BAGG). — Insect damages are light. Corn looks well, and has a full average acreage. The hay crop is light, and haying has only just begun. Early potatoes are an average acreage, and the outlook is promising. Early market-garden crops are abundant and cheap. Dairy products are abundant and cheap; no sickness among cattle. Pasturage is in good condition. Currants, cherries and strawberries are abundant, and appear well. The dry weather is the only drawback.

*Ludlow* (C. H. BENNETT). — Potato bugs are doing some damage. Corn looking very well; acreage larger than usual. No hay cut yet; crop will be light. Not as many early potatoes planted as usual, but the crop looks well. Quantity of dairy products about the same as last year; prices lower; no sick cattle. Pasturage in fair condition. The frost spoiled nearly all fruit and berries. Rye is ripening fast, and will have a good berry but short straw.

*Monson* (W. M. TUCKER). — Cut worms and potato bugs are doing some damage, but not excessive. Corn looking well, but

planted late ; acreage in excess of former years, especially in fodder corn. Very little haying done as yet. Acreage of early potatoes not above that of late years, looking fairly well. Market-garden crops rather late, and injured by early frosts ; markets very fair. Excess of dairy products ; prices low ; dairy stock in good health. Pasturage not excellent, but better than a year ago. Strawberries a fair crop. Cherries more plenty than usual. Apples, pears, peaches and plums have set well and promise fair crops.

#### WORCESTER COUNTY.

*North Brookfield* (J. H. LANE). — The potato beetle is doing the most damage. Corn is looking finely ; acreage increased one-sixth. Not much haying done yet ; grass all wrong except on low ground, and not much save where the land is in high condition. Early potatoes will not be an average crop, unless rain comes soon. Dairy products the same as usual in quantity and price ; stock in as good health and condition as possible. Pasturage is in very bad condition. Apples and pears will be a three-fourths crop.

*Barre* (J. L. SMITH). — Potato bugs are doing the most damage. Corn is looking well ; more planted than usual, especially fodder corn. Not much hay cut yet ; a three-fourths crop ; Hungarian, barley and other fodder crops are being planted to help out. Full as many early potatoes planted as usual, and they are looking well. Prices of dairy products same as usual ; health of stock fairly good, quite a good many came out thin in flesh. Pastures are beginning to dry up. Apples an average crop. Crops are looking well, but must suffer if rain does not come soon.

*Templeton* (LUCIEN GOVE). — Potato beetles are more plenty than usual. Corn is not so forward as in some years ; acreage rather increased. A few have commenced haying ; crop lighter than for many years. About the usual acreage of early potatoes planted, but at present they are quite uneven. Early market-garden crops were rather light, and sold slowly. Dairy products less in quantity than last year ; the lowest price for butter for many years ; milk sold at the usual rates. Lack of rain has made pasture feed short. Currants, strawberries, raspberries and blueberries very light crops ; cherries and plums the same ; peaches promise a good crop.

*Winchendon* (W. H. SAWYER). — Corn looking well, and about the usual acreage planted. Hay will not be over a two-thirds crop. More early potatoes than usual were planted, and they are looking well, considering the dry spell. Early market-garden

crops about average in yield and price. Dairy products about the same as last year in quantity and price. Pastures may be described as poor, poorer, poorest. Dry weather affected the strawberry crop.

*Fitchburg* (Dr. JABEZ FISHER). — Potato bugs, the pear tree psylla and cut worms have been working, but are now about done. Considerable haying has been done; yield not over two-thirds of the average. Acreage of early potatoes increased; they now look finely, but need rain. Pastures are becoming dried up. The prospect for apples in general is less than half a crop; pears, 75 to 80 per cent.

*Bolton* (H. F. HAYNES). — Potato bugs have begun to do some damage. Corn looks well, with a full average acreage. Old hay fields are cutting half a crop; new fields look well. Early potatoes are looking very well, but are in need of rain. Early market-garden crops were a light yield, with prices average. Milk brings 1 cent per can less than last year. Pasturage winter-killed, and is in poor condition. Blackberries and raspberries nearly all winter-killed; strawberries were hurt by frost, but were a fair crop.

*Berlin* (P. B. SOUTHWICK). — Potato beetles, cut worms and squash bugs are doing the most damage. Not the usual amount of corn planted; backward, but of good color. Not much hay cut yet, and the prospect is not very promising. A full acreage of early potatoes, which are looking well. The yield of early market-garden crops has been fair, but the price has been below average. Dairy products compare favorably in quantity and price with last year; stock is healthy. Feed is getting short in the pastures. Asparagus was a large crop, but prices have been low.

*Worcester* (S. A. BURGESS). — Squash, rose and potato bugs and cut worms are doing some damage. Indian corn is looking well, with acreage about average. Haying is commencing well; crop poor and light. Early potatoes have about the usual acreage; look well, but need rain. The yield of early market-garden crops have been average, and prices low. Dairy products are about as last year, and only a few cattle are out of condition. Pasturage is in poor condition. Apples scarce, pears fair, grapes and blackberries good.

*Westborough* (B. W. HERO). — Potato bugs and cut worms are doing the most damage. Corn looks well; acreage about average. But little hay has been cut; a good average crop. Early potatoes promise a full crop; acreage a little smaller than last year. Market-garden crops about the same as in previous years. Dairy products about as last year; stock healthy. Pastures are greatly in need of rain. Strawberries not an average crop, other small

fruits promise well, peaches a large crop, pears average crop, apples a very small crop. The canker worm did much damage in some parts of the town.

*Douglas* (WM. ABBOTT). — Potato bugs and squash bugs are doing the most damage. Corn is looking well, with about the same acreage as last year. Haying not begun; less than an average crop. Acreage of early potatoes about average; crop needs rain badly. Early market-garden crops about as last year; need rain for late crops. Quantity and price of dairy products same as last year; health of stock good. Pastures are dry. Strawberries a fair crop, outlook poor for all other small berries and for apples. Oats will be light.

#### MIDDLESEX COUNTY.

*Marlborough* (E. D. HOWE). — No very serious damage by insects, though the potato beetle is doing some. Corn is looking very fair; acreage about as usual. Haying just beginning, with light crop. Acreage of early potatoes average, with the promise of a full average crop. Prices of early market-garden crops fair; yield average. Milk maintains a uniform price. Pastures are in fair to good condition. Strawberries have been below average both in quality and quantity; raspberries promise fair.

*Framingham* (H. S. WHITTEMORE). — Cut worms and potato bugs are doing some damage. Corn is looking well, but is backward; acreage larger than in former years. Many are haying, and the prospect is for a light crop. Less early potatoes planted than in former years; late, but looking fairly well. Early market-garden crops were a poor yield, with low prices. Quantity of dairy products fully up; prices better than last year. Pastures are drying up. Apples, pears and cherries very light, and very few strawberries. Beans looking finely.

*Newton* (OTIS PETTEE). — Potato bugs are doing the most damage among insects. Corn is not quite so vigorous as usual. Haying is progressing rapidly; crop very light, owing to protracted drought. Yield of market-garden crops light, and unless we have early rain prospect not good. Pastures are very dry and feed poor. Strawberries are small. No rain since June 4.

*Westford* (ARTHUR WRIGHT). — Potato bugs and rose bugs are doing some damage. Corn not quite as forward as last year; acreage about the same. Haying commenced early; crop light. Early potatoes looked well until the drought commenced, and low lands still look well. Dairy products same as last year; stock generally healthy. Pasturage on high lands dry. Strawberries not half a crop.

*Woburn* (W. H. BARTLETT). — Cut worms and canker worms are doing the most damage ; potato beetles not as plenty as formerly. Sweet corn is looking well, but is late. All busy haying ; crop very light, sometimes not over half a crop. Early potatoes are looking very well. Yield of early market-garden crops light, and prices low ; trade quiet for the season of the year. Condition and health of stock good. Yield of berries light ; currants a failure. Peas not over half a crop, and pods short ; rhubarb has hardly paid for pulling ; asparagus sold well, but crop not a full one ; tomatoes looking very well.

#### ESSEX COUNTY.

*Haverhill* (EBENEZER WEBSTER). — Canker worms are doing the most damage of any insect. Corn is looking well ; acreage about as usual ; a good deal will be used in the silo and for fall feed. Haying has just begun ; crop light on account of drought. Rather larger acreage of early potatoes than usual, but there will hardly be an average crop. Dairy products about as last year ; cattle in good health. Pastures are good, but feel the dry weather. Cherries and strawberries were a partial failure ; raspberries look well.

*Groveland* (ABEL STICKNEY). — Cut worms are more complained of than other insects. Corn is looking well ; acreage a very little increased. Many have commenced haying ; prospects not first class. An average crop of early potatoes cannot be expected ; not much change in acreage. Yields of early market-garden crops less and prices higher than in former seasons. Dairy products unchanged in quantity and price ; stock in good health. Pastures are looking badly at present. Pears good, peaches fair, plums fair, apples poor, strawberries a poor crop, cherries good, blackberries good, currants fair.

*Newbury* (G. W. ADAMS). — Potato bugs, canker worms and currant worms are the most prevalent. Acreage of corn rather greater than usual ; condition bad, from lack of rain. Haying just commencing ; less than a full crop, perhaps 80 per cent. Rather less acreage of early potatoes than usual ; crop drying up. Yield of market-garden crops good, but prices lower than ever before. Dairy products about as last year in quantity and price. Pasturage in fair condition, but fast drying up. All kinds of fruits and berries started well, but have dried up.

*Topsfield* (B. P. PIKE). — The usual number of potato bugs and horn flies are present. Corn is in excellent condition ; acreage considerably increased, and a large amount grown for fodder. Haying just commenced ; about a two-thirds crop. Acreage of early potatoes about average, and the prospect is good. Early

market-garden crops about as usual in yield and price. Quantity and price of dairy products about as last year; condition and health of stock never better. Pasturage never was shorter at this season. Fruits and berries are all very short crops.

#### NORFOLK COUNTY.

*Medfield* (G. R. CHASE). — Little injury from insects. Corn needs rain soon, acreage average. Haying just beginning; small crop, not exceeding 65 or 70 per cent. About 80 per cent of the usual acreage of early potatoes, and they do not promise a full crop on account of drought. Prices of market-garden crops low and prospect poor for later ones. Dairy products less in quantity than last year; prices lower for butter than usual; stock healthy. Pastures are fast drying up. Strawberries poor owing to frost and drought. On the whole it is a hard season.

#### BRISTOL COUNTY.

*Mansfield* (WM. C. WINTER). — Rose bugs are doing considerable damage to rose bushes, grape vines, etc. Corn looking fairly well; acreage about as usual. Haying just commenced; crop light on high ground, fairly good on low. Early potatoes not largely grown, but acreage about as usual and crop looking fair. Early market-garden crops below the average in yield and price. Dairy products about as last year in quantity and price, health of stock good. Pasturage needs rain, but is as yet fairly good. Strawberries a light crop, and prices low; apples about 40 per cent of a full crop, pears 60 per cent, peaches 30 per cent, plums 20 per cent, blackberries 100 per cent, raspberries 50 per cent, currants and gooseberries 80 per cent.

*Attleborough* (ISAAC ALGER). — Corn looking well, acreage about as usual. Not much haying done as yet, with prospect of a small crop. Acreage of early potatoes about average; looking fairly, but need rain. Early market-garden crops yielded fairly and brought good prices. Dairy products and stock about as usual. Pasturage in pretty fair condition. Apples do not promise much of a crop, pears a full crop, strawberries about an average crop; cranberries better than last year, but not an extra large crop.

*Dighton* (J. N. PAUL). — Cut worms, onion maggots and cabbage maggots are the most prevalent insects. Indian corn is looking well; acreage one-half larger than last year. Haying has not commenced yet; prospect of a good crop. The acreage of early potatoes is larger than usual, and the crop is suffering now for want of rain. Market-garden crops are less in quantity

and price than usual. Dairy products about the same as last year; stock in good health. Pasturage in good condition. Apples and pears good. The strawberry crop has been the poorest in ten years in quality, quantity and price.

*Swansea* (F. G. ARNOLD). — Canker worms and potato bugs are doing some damage. Corn is looking good, and the acreage is about the same as last year. Haying has not commenced here, but the prospect for a crop is good. Acreage of early potatoes larger than usual, but the dry weather of the last week is pinching them badly. Cattle give a good flow of milk, with prices same as last year; health of all stock good. Pasturage has been good, but needs rain now. Strawberries plenty and prices low; apples did not set well; pears will be a small yield.

#### PLYMOUTH COUNTY.

*Brockton* (DAVIS COPELAND). — Canker worms and the striped squash beetle are doing some damage. Not much field corn grown; ensilage corn rather uneven. Haying just begun; crop very light on high ground. Acreage of early potatoes about as last year, and they promise a full average crop. Dry weather has shortened the yield of many early market-garden crops; prices have been fair. Plenty of milk, price same as usual; stock healthy. Pastures are short. Strawberries a small crop.

*Lukeville* (ELBRIDGE CUSHMAN). — Rose bugs, potato beetles and cut worms are the most prevalent insects. Indian corn is looking well, and the acreage has been increased 10 per cent. Haying is rapidly commencing, with the prospect of a fine crop. Early potatoes promise a full average crop, on an acreage increased 15 per cent over last year. Early market-garden crops compared favorably in yield and price with former years, and the prospect is good for later ones. Dairy products are above last year in quantity and price, and stock is in normal condition. Pasturage is in good condition as yet. Strawberries are a fair crop.

*Halifax* (G. W. HAYWARD). — Potato bugs are doing some damage. Corn is looking finely, with about the usual acreage. Some hay is being cut; from one-half to two-thirds of a full crop. A full acreage of early potatoes was planted; some are uneven, and without rain soon the crop must be light. Prices for market-garden crops low, with better prospects ahead. Dairy products about the same as last year in quantity and price; health and condition of stock good. Pastures very poor and dry, and in almost all cases cows are fed at the barn. Prospect for huckleberries fair, strawberries a failure, all other berries killed by frost. There will be some apples and pears. Early peas are all drying up.

*Marshfield* (J. H. BOURNE). — Tent caterpillars and canker worms did some damage in the first part of June. Corn is looking splendidly, with a larger area than usual. Haying progressing fairly well, with a two-thirds crop. Acreage of early potatoes a little larger than usual; promise for a large crop, with rain. Peas are a good crop, price as usual; most market-garden crops not harvested. Dairy products good in quantity; prices small; stock in healthy condition. Pasturage has been in good condition, but is beginning to feel the drought. The apple crop must be small; some peaches; berries suffer from the dry weather.

#### BARNSTABLE COUNTY.

*Sandwich* (J. R. HOLWAY). — Fire worms on cranberry bogs and potato bugs are the most troublesome insects. Indian corn is looking fairly well; acreage about average. Haying has just begun; crop rather light. Early potatoes have an average acreage, and are looking well. Dairy products about average in quantity; prices lower than last year; stock in good health. Pastures are drying up. Cranberries are blooming very full; strawberries a small crop, apples and pears rather scarce, grapes blooming well.

*Mashpee* (W. F. HAMMOND). — The fire worm, gray worm, potato bug and Hessian fly are doing some damage. Corn is looking well; acreage about the same as last year. The hay crop will be light, on account of dry weather. Early potatoes are about the usual acreage, with prospects for an average crop. Market-garden crops so far are below the average; prices about the same as usual; prospects for later ones good. Dairy products good; price same as last year; health of dairy stock good. Pasturage is very good. Apples and pears will be a half crop, peaches a failure, strawberries good, raspberries and currants look well.

*Dennis* (JOSHUA CROWELL). — Potato beetles are doing some damage. Corn is looking fair; acreage about average. Haying has just commenced; crop about as last year. The acreage of early potatoes is increased a little over last year, but without rain soon the crop will be short. Dairy products about as in other years; stock in good health. Pastures are very much in need of rain. Strawberries were a small crop, and the outlook for cranberries is not very encouraging.



# BULLETIN OF MASSACHUSETTS BOARD OF AGRICULTURE.

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## ENGINEERING.

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### HINTS ON LAND DRAINAGE.

All plants with which agriculturists and horticulturists concern themselves are air plants, in that their roots are dependent upon air in the soils in which they grow. Consequently the available depth of any soil for agricultural purposes is practically limited to the depth to which air can penetrate it, and cannot exceed, therefore, that part of it which is above the water table, or the level at which water of saturation stands in the ground.

### EFFECTS OF LAND DRAINAGE.

It is the primary object of artificial drainage, then, to increase the effective depth of soils and to improve their general character by lowering the water table in or under them. Among its benefits and advantages are the following:—

*First.*—It increases (with the aid of the deeper cultivation permitted thereby) the amount of soil space and material for the root-feeding of plants and for bacterial action and other agencies in vegetable nutrition.\*

*Second.*—A greater proportion of the rain and snow water leaches through and surrenders to a well-drained soil the elements and agents of plant nutrition which such waters transfer from the atmosphere to the soil, and, as a further consequence, the washing away of the soil by the flow over its surface is reduced.

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\* The degree of moisture has a marked influence upon the activity of the micro-organisms of the soil which aid in the nutrition of plants, especially the root-tubercle bacteria and bacteroids, through which leguminous plants, such as lupines, beans, clovers, alfalfa, etc., assimilate or fix free nitrogen from the air.

Experiments by E. Gain indicate that the development of such tubercles is about twenty times greater in moist soil than in dry soil, with a corresponding increase in the assimilation of free nitrogen. They also lead to the conclusion that a medium amount of moisture in the soil (fifty per cent of that required for complete saturation) is more favorable to the development of root tubercles than higher or lower amounts. (United States Experiment Station Record: Vol. V., pages 110-113; Vol. VI., page 870.)

*Third.* — It affords also a *quicker* escape of the water falling thereon, thus shortening the time during which the soil is saturated with moisture and increasing the time during which it is aerated in a condition most favorable to plant growth.

*Fourth.* — Plants rooted in a deep soil are better able to withstand drought, chiefly by reason of the fact that beyond certain depths the evaporative power of sun and wind does not extend to an effective degree, whereby a drought that may be ruinous where, for want of drainage, the soil is shallow, may have little effect upon a deep, well-drained soil.

*Fifth.* — The capillarity of clayey soils — that is, the quality by which they absorb and lift water from below and convey it upwards to the roots of plants (as a wick lifts oil from the body of a lamp to the flame at its upper end) — is increased or quickened by deeper cultivation and root action therein.

*Sixth.* — Considerations of color, texture, material and exposure or direction of slope tend to modify somewhat through evaporation the physical character of soils as affected by drainage; yet as a rule a deeply drained soil is more uniform and constant in its moisture conditions or humidity than is a shallow one; and it may be accepted as an axiom that variation in humidity decreases as the depth or thickness of the aerated soil increases.\*

It has been usually held that a drained soil better withstands drought, because it absorbs or receives air more freely into its interstices or pores, and extracts therefrom by chemical and physical action the water which such air contains. This theory I deem untenable and inadequate to explain the superior capacity of well-drained soils to withstand drought. The true explanation is to be found, I doubt not, in the greater penetration of the roots to depths less affected by drought and in the increased power of the deeper soil to obtain moisture by capillary attraction from below.

The insufficiency of aeration alone to supply moisture in amounts large enough to sustain ordinary vegetation is often shown by drained peaty soils, which, though of the most porous and absorbent nature, are not only incapable, during seasons of prolonged drought, of acquiring moisture by aeration (absorption from the air above), but are equally incapable of receiving it by capillarity (absorption from the water table below). The difficulty with such soils is that the size of the pores is so large and their volume so great that, while permitting the greatest possible degree of aeration, they are incapable of lifting water to a sufficient height by capillary attraction, and so remain dry. The same is true of soils

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\* E. Wollny, United States Experiment Station Record, Vol. VI., page 558.

composed of or underlaid by *coarse* sand or gravel. They too admit of the highest degree of aeration, but have little capillary power; whence it appears that it is the extremely porous soils of whatever material—that is, those best adapted for aeration—that suffer most in time of drought.

Well-drained soils, then, are not so effectively benefited in a dry time through the moisture which they absorb from the air as through that which they permanently retain below the effective action of evaporation and above the water table, supplemented by that absorbed from below through capillary attraction.

Such soils, whether too exclusively of peat or of coarse sand, may be improved by processes which tend to compact them so as to reduce the size and volume of their pores, thus diminishing aeration and increasing the moisture obtained by capillary attraction. In the case of well-drained peat soil *heavy rolling* after sowing or planting is often an effective aid to the germination of the seed. In dry times grass seed sown on such land will often be found to sprout and grow in the deep foot-prints of men and horses, while elsewhere no growth may appear until copious rain has fallen. Another method is by increasing the compactness and weight of peat by adding to and mixing with it either fine sand, clay or marl, or a combination of them, which will also improve its general chemical and physical qualities; while the excessive porosity of sandy soils may be improved by the application of clay or marl and decomposed muck or peat, the fine particles of which, filling the coarser pores of the sand, tend to retard evaporation and to promote the absorption of water from below.

#### HOW TO DRAIN LAND.

Under-drainage works *can*, and if rightly done *will* be, strictly speaking, *permanent* improvements. The construction of farm buildings, roads, walls and fences, though usually classed as such, are of a transitory and ephemeral character, compared with a well planned and thoroughly executed system of tile drainage.

That a drain may be permanent in its life and action, it must be so planned and constructed as to *let the water in* and *keep the silt* or earthy matter *out*. An open ditch may do the first admirably for a time, but soon fills up with the undermining and caving-in of its banks, and by the in-washing of loam and organic matter by the flow of surface waters into it. A stone or “blind” drain may admit water freely for a time, and conducts it fairly well where a considerable inclination or fall to a suitable outlet is practicable; but when laid (as such drains usually must be) in

earth made up of fine particles it is liable to become clogged by the infiltration of silt.

Such drains can be made silt-proof, and consequently permanent, by enclosing or surrounding them with silt-excluding materials, such as boards (for a foundation), green brush, turf, old hay or straw, coarse gravel, etc., according to availability and other circumstances, which will readily suggest to the user the best of such means at his disposal.

Practically, however, where the main object is thorough drainage, and not the clearing up of stone or brush (and in most cases, even where such clearing is collaterally or contingently desirable), tile drains are superior to any other kind, because:—

They cost less in the sum total of labor and material.

They admit of being laid at flatter grades, and therefore of draining larger areas of level lands to an outfall of limited depth.

They are easily examined (through silt-wells), and imperfections or stoppages may be thus approximately located for repair or removal.

They are more durable, and, properly laid and cared for, are practically permanent in their life and operation.

There is a popular impression that ground water enters a tile drain through the porous bodies of the tiles themselves. This is essentially wrong. Indeed, the best tiles are those that are uniformly hard-burned to such a degree (just short of vitrification) that nearly all physical porosity has disappeared. In point of fact, at all times, excepting when the amount of water seeking to enter a drain exceeds its maximum capacity when running full, the water enters at the bottom of the *joints* and at the sides, as far up only as the surface of the stream flowing in and through the drain. One should not be tempted, therefore, to purchase tile for which is claimed the virtue of admitting water through the porous material comprising them, as such porosity serves no practical purpose, and can result only from insufficient burning, with consequent want of durability.

The joints of any land tile (however accurately moulded, however well their shape may be retained in the process of burning, and however closely fitted in laying) afford not only ample but practically the sole means for the admission of water from the soil around them. Indeed, the key to success in tile drainage, after securing a suitable outfall and adequate grades leading downward thereto, lies in making such close-fitting and well-protected joints at the abutting ends of the tiles that clay and fine sand cannot be carried into the drain by the water as it enters through the joints. The subsoils of lands which best repay drainage are

usually composed so largely of clay, or of very fine sand with or without a clay admixture, that not even the closest joints that can be made are thin or close enough, without special protection, to prevent *some* silt being carried into the drain, whence it becomes necessary to provide further means to prevent the entrance of such particles. This is usually done by laying a strip of tarred paper, oil cloth or heavy burlap (about an inch and one-half wide for small tile and two inches or more for the larger sizes) over the top and sides of each joint, in close contact with the outer surface of the tiles. Strong, tough turf, with most of the soil shaken out, may be used for the same purpose.

In quicksand especial care must be observed to lay and keep the tile in their proper grade and line, which may best be done by first placing and securing in the bed of the trench, at the true and established grade of the drain, a strip of board or plank about two inches wider than the outside width of the tile itself. At each joint of the boards a splicing piece about twenty inches long should be laid along the under side of the abutting ends of the boards, and both boards nailed thereto. Upon this continuous foundation the tile are to be laid in a true line, and where further security against lateral movement is required ordinary lath may be placed on edge along and against each side of the tile, the joints being first covered with strips of tarred paper or other material, as above described. In back-filling the trench the coarsest material that is available should be first used in contact with the tile, the constant purpose to be kept in view being to keep the quicksand out of the joints by placing around the tile such material as will permit the admission of water only.

Where gravel or coarse sand may be easily and cheaply obtained, one of the best methods of laying tile in quicksand or soft clay is to excavate the trench three or four inches below grade, and fill up to the grade with gravel or coarse sand; then lay the tile upon the gravel bed in the usual manner, cover them with the same material to a depth of three or four inches, and complete the back-filling of the trench as before, with the coarser material toward the bottom. The result is a tile drain laid in a material not easily displaced by external influences, and surrounded by a continuous filter which will admit water with the utmost freedom and exclude silt. Where the cost of obtaining such coarse material is large, its use may be confined to surrounding the *joints* only, to a distance of two or three inches; but a more thorough and permanent work will be insured by bedding and covering the entire tile with it.

Under-drains should be deep enough to encourage the fullest development of root growth, to avoid any disturbing and dis-

integrating effects from freezing and to escape the danger of being obstructed by roots entering at the joints. Lowering the water table much below the greatest depth of root action diminishes the moisture raised by capillarity, and is therefore disadvantageous. Subject to these considerations and to such variations as the necessities of the grade of the drain and the inequalities of the surface of the ground may involve, from three and one-half to four and one-half feet is a fair average depth to adopt. Less may be used where a low or deep outfall cannot be had, as in the case of flat lands situated at a slight elevation above an adjacent pond or stream which fixes the level at which the main drain may discharge.

The distance between drains is governed chiefly by the greatest depth, within the limits already stated, at which they can be laid, and by the permeability of the soil and subsoil to be drained thereby. In clayey soils, through which water percolates but slowly and with the greatest difficulty, the drains should be placed at a distance of about six to seven feet for every foot of their depth; while for loamy soils, underlaid by sand, equally good drainage may be secured if the drains are laid at nearly double that distance apart, or ten to fifteen feet for each foot of depth, depending upon the porosity of the underlying material. Thus in clay or hard-pau drains three to four feet in depth should be laid from twenty to thirty feet apart, and for soils underlaid by sand the distance (for the same depth) may be forty or fifty and sometimes sixty feet, while in material of intermediate character or porosity a distance of thirty to forty feet would be suitable.

Without discussing the various considerations affecting the sizes of tile to be used, it may be said that one thousand feet laid forty-five feet apart will drain an acre of land underlaid by a permeable soil, and that the maximum amount of ground water collected and discharged thereby would rarely exceed the full capacity of a two-inch tile with round bore, laid at such a grade or fall that the water flowing through the same will carry along such fine silt as may unavoidably enter at the joints, say not flatter than three to four inches in a hundred feet. With a fall of six inches in a hundred feet the same size of tile will carry the water collected by about fifteen hundred feet of drains, and will therefore be sufficient for an acre and one-half of land; while with a fall of twelve inches in a hundred feet two-inch tile will serve about two thousand feet of drains, or two acres of porous land.

In clayey lands less of the rainfall percolates into the soil, consequently drains therein will receive a smaller quantity of water per acre, which in ordinary practice may be assumed to be about

one-half as great as that in lands underlaid by free water-bearing sand. Therefore the same size of tile or capacity of main drain will suffice for about double the area of clayey subsoils that would be needful for sandy subsoils; and, inasmuch as the drains should be placed at about one-half the distance in clayey soil, it follows that the amount or length of drain that may be discharged through a two-inch tile for such lands is about four times as great as in those having a free subsoil. Thus, while a thousand feet of two-inch tile, laid forty-five feet apart in a free subsoil, will serve one acre, four thousand feet of the same size, laid twenty-two and one-half feet apart, will serve two acres of clay land.

The relative capacities of different sizes of tiles are approximately as follows, that of a two-inch tile being indicated by 1, to wit: —

Capacity of two-inch tile equals, . . . . .	1.00
Capacity of two-and-one-half-inch tile equals, . . . . .	1.50
Capacity of three-inch tile equals, . . . . .	2.50
Capacity of four-inch tile equals, . . . . .	5.00
Capacity of five-inch tile equals, . . . . .	7.50
Capacity of six-inch tile equals, . . . . .	12.50
Capacity of eight-inch tile equals, . . . . .	25.00

Thus for land requiring two-inch tile to carry the maximum drainage from one acre, a main drain of four-inch tile will serve five acres, one of six-inch tile twelve and one-half acres and one of eight-inch tile twenty-five acres. These sizes may be considered suitable for the areas stated, where the fall is not less than three, or better, four inches per hundred feet in main drains or laterals. Where the fall is twice as much, or not less than six inches per hundred feet, the same sizes will suffice for fifty per cent larger areas; and in general for clayey soils, with the same inclination as in free soils, tile of a given size will serve double the area.

Larger tile than are absolutely necessary to carry the maximum amount of water to be discharged through them make an inferior though more costly system of drainage, — inferior, because the velocity of flow is slower through tile of larger bore, consequently any silt which enters is more certain to be deposited in the tile and to gradually fill it up.

The flattest grade at which tile drains should be laid should be sufficient to insure a perfect scour, — that is, the carrying along by the water flowing therein of all silt which may enter at the joints. With care in laying at true grade, a fall of three inches in a hundred feet is as little as may be safely adopted for two-inch tile, and where the topography or surface contour allows, steeper

grades should be used. Where the declivity is very great, as upon the springy sides of many New England hills of hard-pan, the lateral drains should as a rule run diagonally with the slope, instead of in the direction of most rapid descent, so as to more effectually cut off springs and underground water veins, which otherwise might appear at the surface between the laterals.

The larger the volume of the flow, and consequently the greater the size of the drain to carry it, the flatter may be the grade at which it may safely be laid. Thus, while the fall of two-inch and three-inch drains should rarely be less than three inches per hundred feet, a four-inch drain may with equal safety have a fall of two and one-half inches only, and six-inch and eight-inch drains of two inches per hundred feet. It should be borne in mind, however, that an obstruction in a large or main drain is a much more serious matter than in a lateral, and consequently such flat grades should be permitted only in cases of actual necessity.

#### LAYING OUT AND CONSTRUCTION OF DRAINS.

The laying out of drains, especially at flat grades, can be properly done only with the aid of accurate levelling instruments, which work can be done by an engineer or surveyor of ordinary skill and capacity. The expense of such services is trifling, compared with the facility, convenience and certainty of successful results thereby insured in the work.

The following suggestions may aid in laying out and constructing the work.

Having secured the proper outlet for the main drain, mark the position of all mains and laterals by driving into the ground at each end of each line, and also at every point where there is a change either in grade or direction, a grade peg or hub level with the surface. Beside it drive a reference stake, leaving one foot exposed, and mark thereon the depth at which the drain is to be laid below the top of the peg.

Upon opposite sides of each peg, across the line of the drain and far enough to clear the trench, drive two stakes firmly into the ground, leaving two or three feet out, and at some uniform height above the established grade of the drain nail across each pair of stakes a batter board made level from end to end, and mark thereon the centre line of the trench by a nail or notch in the upper edge plumb over the peg. Assume, for example, that all the batter boards are to be set at the uniform height of six feet above grade. If the cut or the depth of the trench marked on the reference stake at the lower end of any given drain is 4.25 feet, then the batter board must be placed 1.75 feet above the peg;



and in like manner, if the cut at the next peg on the same line is 3.8 feet, the batter board must be set 2.2 feet above it. Thus the lines and grades of the entire system are established and fixed safe from disturbance during the execution of the work.

In digging the trenches, begin at the outlet or lower end of the main drain and work up grade, thus giving the water encountered in the work a chance to run off without pumping. It is usually better also to lay the tile in the same order, especially if the quantity of water is large and the trenches liable to cave. Throw the surface soil upon one side of the trench and the undersoil upon the other; and in refilling restore the different materials to their proper places, observing that the filling immediately around the tile should be of the coarser materials best adapted to exclude silt.

Make the trench no wider than is necessary for the convenience of the workmen, say from twenty to twenty-four inches at the top and from five inches upward at the bottom, according to the size of the tile. Excavate to the proper grade, and dress the bottom of the trench accurately by using a levelling rod or pole having a target or conspicuous mark thereon at the same distance from the bottom of the rod as that at which the batter boards are placed above the grade line. Test the depth of the trench frequently as the work progresses, by having one man hold the rod vertically in it while another sights over the top of the two batters nearest thereto, to determine whether the target or mark thereon is in the same line with the batters. Where the target stands above the line of the batters, the trench must be deepened; while if it stands below the line the trench is too deep, and must be refilled with material firmly packed until the target is in the same grade with the batters, with the rod standing on the bottom of the trench. Constant care and watchfulness should be exercised to avoid digging below the proper grade, as a natural bed that has not been disturbed furnishes a better and more secure foundation upon which to lay the tile.

Of the various forms of tile in the market, that known as "Ohio" or "Ohio land" tile is among the best. The bore is circular in cross-section, while the outside is polygonal (either hexagonal or octagonal). They have the advantage, therefore, of six or more sides or beds upon which they can be laid. All drain tile, however carefully made, are liable to be warped or curved in drying and burning, whereby with but one bed upon which to lay them many of the joints are certain to gape open upon one side or another, and thus admit silt more readily. A tile, however, which can be laid upon any one of six or eight different sides can be turned and tried upon all of them until a close joint is secured.

“Sole” tile of the same nominal size has less capacity, because the bore is elliptical, and its size is designated by its longer diameter. It has, moreover, only one bed, and hence it is impossible to make so good joints in laying it. “Round” tile have the same capacity as “Ohio,” but, having no flat surface upon which to lie, they are less stable in the trench before covering, and therefore more liable to be thrown out of line in backfilling. In the Boston market both round and sole tile are somewhat higher in price than the Ohio tile.

Silt basins should be placed at the intersection of laterals with main drains and at all points where there is a change in direction, also where there is a change from a steeper to a flatter grade. A simple method of making a silt basin is by placing a vitrified sewer pipe of ten inches or greater diameter vertically, or upon end, in the line of the drain or drains leading into and from it. The bottom of the pipe should rest upon a plank or flat stone about a foot below the drain, and with the bell end upward. Lead the drains into and out of it through holes of proper size cut in the sides of the pipe at their proper level. In the bell at the top of this pipe set another of the same size, and so extend the silt basin either up to the surface of the ground or to within about a foot of it, according as it may be more desirable to cultivate over it without obstruction, or to have it always accessible for inspection and cleaning out without digging. Where it is to be covered, the top should be closed by a circular cover of plank or stone set in the upper bell end, and its location marked by a stake driven beside it, so that it may be occasionally uncovered and cleaned out so long as there shall continue to be any accumulation of silt in it. Where the silt basin extends to the surface of the ground, small animals and foreign matter should be excluded in a similar manner by a cover of wood, stone or iron, fitted and set into the bell of the pipe.

It goes without saying that the best time in which to construct a system of land drainage, other conditions being equal, is during seasons of long-continued drought, such as have occurred during the open season of 1894 and up to the present time this year. Then the level of the ground water, or the water table, is reduced to its lowest natural limits, and the work can be carried on at less cost and done in a more thorough manner by reason of the absence of water. Moreover, as a rule, the drains may be laid at a greater depth at such times than when the ground is full of water.

WILLIAM WHEELER,  
*Engineer.*

SERIES OF 1895.

BULLETIN No. 3.

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MASSACHUSETTS  
CROP REPORT

FOR THE

MONTH OF JULY, 1895.

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ISSUED BY

WM. R. SESSIONS,  
SECRETARY STATE BOARD OF AGRICULTURE.

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# CROP REPORT FOR THE MONTH OF JULY, 1895.

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OFFICE OF STATE BOARD OF AGRICULTURE,  
BOSTON, MASS., Aug. 1, 1895.

Bulletin No. 3, Crop Report for the month of July, is herewith presented. Particular attention is called to the article on "Birds as Protectors of Orchards," by the ornithologist of the Board, at the end of this bulletin.

## PROGRESS OF THE SEASON.

Report No. 128, New Series (July, 1895), of the Statistician of the United States Department of Agriculture gives the acreage of corn, as compared with that of 1894, as 107.8, being an increase of 6,000,000 acres, and making the total area 82,000,000 acres. The average condition is 99.3 against 94 last July.

The condition of winter wheat is 65.8 against 71.1 in June, and 83.2 last July. The condition of spring wheat is 102.2 against 97.8 in June and 68.4 in July, 1894. The average condition of all wheat is given as 76.2. Of the 1894 crop, 5.7 per cent yet remains in farmers' hands.

Oats are suffering badly from dry weather, but show a condition of 83.2 against 84.3 June 1, and 77.9 July 1, 1894. Winter rye has fallen from 85.7 June 1 to 82.2. Spring rye shows a condition of 77, which is exceeded in the States of large production. The condition of all rye is 80.7 against 87 last year. Barley rose in condition from 90.3 to 91.9 during the month, against 76.8 last year.

Increase of area of potatoes continuous since 1892; now 7.9 per cent greater than last year. Condition averages 91.5. Less than the usual amount of damage from the potato bug and other insects. Where the condition is low, the cause is drought and late frosts. Acreage of sweet potatoes reduced and condition low in some States.

The low price of tobacco has decreased the acreage to 84.8 per cent that of last year. Lack of rain and damage from insects have reduced the condition to 85.9 against 81 last year.

The late season retarded the growth of cotton, and a weak stand is reported. Average condition 82.3 against 81 in June and 89.6, July 1, 1894.

Condition of clover 73.9 against 80.2 in 1894. Some winter killing and damage from insects are reported. Condition of timothy 70.8 against 77.3 in 1894. The low condition is due to extended drought. Local improvement from recent rains is noted. During June the condition of pastures declined from 88.1 to 78.7. There is general complaint of drought except on the Gulf coast and in the Rocky Mountains.

The average weight of fleeces is given as 5.6 pounds against 5.3 pounds in 1893 and 1894. Rice has fallen 4.8 points, and now stands at 84.4.

The condition of apples has been materially lowered since the report of June. Frost at time of bloom, subsequent droughts and heavy dropping are the main causes of the impaired prospects. Returns relative to the peach crop show a general decline in conditions. The figures from States range from 106 for Georgia and 90 for Connecticut to 22 for Ohio. Frosts have done much damage to grapes.

## TEMPERATURE AND RAINFALL FOR THE WHOLE COUNTRY.

FROM UNITED STATES WEATHER-CROP BULLETINS.

*Week ending July 1.* — On the northern New England coast and from the Rocky Mountains eastward to the Mississippi River, week cooler than usual, and in the States of the Missouri Valley decidedly cool. Elsewhere temperature varied very little from the normal, though generally warmer than usual throughout the plateau regions and on the Pacific coast. Rainfall generally in excess over the Gulf and Atlantic coast district. Abundant rains generally throughout the east Gulf, middle Atlantic and southern New England States. Elsewhere less than the usual amount of rain fell. Week generally favorable though too cool in some sections.

Cotton has suffered from the excessive rains. Corn generally looking well though backward. Winter wheat harvest nearing completion and crop good.

*Week ending July 8.* — Week slightly warmer than usual in regions between the Mississippi River and the Rocky Mountains. Elsewhere week cooler than usual, the deficiency generally amounting to 3° per day and in some sections 6°. Rainfall less than usual along immediate Gulf coast, in the lower Missouri and upper Mississippi valleys, the Lake region and interior of New England. Practically no rain in southern Texas and the upper Mississippi Valley. Elsewhere rainfall generally in excess, in some sections there being an actual fall of 4 inches. Cotton seriously injured by rain in some sections. Corn made rapid growth and general condition excellent. Outlook for spring wheat flattering. Tobacco improving though uneven.

*Week ending July 15.* — In all districts east of the Rocky Mountains, except the Gulf coast, week averaged cooler than usual; also below normal on south Pacific coast. In central and northern California, Oregon, Washington and northern Idaho week warmer than usual. More than usual rainfall over central western sections and over Colorado and northern New England. Elsewhere, except over limited areas, rainfall less than usual. No rain on north Pacific coast. Drought broken in Iowa, partly relieved in Wisconsin and Minnesota, but continues in Ohio and Michigan. Cotton injured by excessive rain but improved over last week. Corn needs rain in Northern States. Outlook for tobacco generally excellent.

*Week ending July 22.* — Week cooler than usual in nearly all districts westward of the Mississippi River and on east Gulf and extreme south Atlantic coasts. From the lower Missouri and central Mississippi valleys eastward, week averaged warmer than usual. Temperature extremes not unusual. More than usual rainfall in Gulf States and upper Mississippi Valley. Generally elsewhere less rain than usual fell, though there were generous showers in some sections. Drought broken in Wisconsin and partially relieved in eastern Ohio and portions of Michigan. Corn made rapid growth and generally improved. Week uniformly favorable for cotton. Tobacco doing well except in Ohio.

## SPECIAL TELEGRAPHIC REPORTS.

WEATHER BUREAU, BOSTON.

*Week ending July 1.* — New England. Cloudy and wet; farm work delayed, but all crops making very rapid growth; grass much improved, pastures excellent; field crops generally ahead of the average.

*Week ending July 8.* — New England. Showery conditions delayed hay-making, and discolored some that was cut and not housed; corn, oats and rye improved; garden vegetables, fruits and berries doing well; some reports of grasshoppers and potato bugs; pastures in excellent condition.

*Week ending July 15.* — New England. Hay harvesting delayed by frequent showers and cloudy weather, but most grass is still improving, while field and garden crops are everywhere growing fast; small fruits generally show light crop; some damage by hail in southern counties.

*Week ending July 22.* — New England. Fine growing weather, except too dry in northwest, and better for hay and grain cutting; tobacco and corn growing fast; potatoes slightly diseased in south; pears, peaches and blackberries good; other fruits generally light.

## WEATHER SUMMARY FOR JULY.

FURNISHED BY THE NEW ENGLAND WEATHER SERVICE.

The weather for the month of July, in Massachusetts, has been cool and unusually cloudy and rainy. The actual amount of rainfall has been less than the normal for the month at many places, especially in the southeast, but the total number of rainy days was in excess. At Boston rain fell to an appreciable amount on twelve days, while a trace was recorded on two other days. The total fall, however, was half an inch less than normal, being 3.59 inches. The fall at Pittsfield, in the extreme western part of the State, was 4.34 inches. The average cloudiness at Boston was 6.3 on a scale of ten.

The temperature was generally lower than usual, with few oppressive days, and no extended spell of hot weather. At Boston the highest temperature was 85° on the 8th, and the lowest 54° on the last morning of the month. At this station the mean daily temperature averaged about two and one-half degrees below the normal.



The cyclonic and anti-cyclonic areas were all of slight energy and poorly defined, except the last two cyclones. One of these passed northeasterly across our district on the night of 27th-28th, giving heavy rain and high winds; the other passed easterly to the north of New England on the 30th-31st with heavy rain and severe local storms. Other sharp local storms have occurred, but they have been of short duration and confined generally to limited districts. On the whole the air pressure has been very variable, although not changing rapidly or to extremes, and consequently the wind has not held long from any one direction, and the temperature has been favorably affected.

On the 13th much damage was done by hail in Hampshire and Worcester counties, many garden and field crops being ruined. On the 9th, 4.13 inches of rain fell at Fitchburg in three and one-fourth hours. In one and three-fourths hours 3.37 inches of the amount was recorded. Dr. J. Fisher, who reported the fall, states that it is unprecedented in his thirty-one years of observation.

In the circular to correspondents returnable July 25 the following questions were asked: --

1. What insects are proving most troublesome in your locality?
2. What is the condition of Indian corn, and what proportion of the crop will be put into the silo?
3. What is the quantity and quality of the hay crop as compared with former years?
4. What forage crops are being raised to supplement the hay crop and eke out the pastures, and what is their condition?
5. What is the condition of market-garden crops, including potatoes, and how have those already harvested compared in yield and price with former years?
6. What is the prospect for apples, pears, peaches, quinces, grapes and cranberries?
7. What is the condition of pasturage in your vicinity?
8. How have rye, oats and barley compared with former years?

Returns were received from 98 correspondents, and from these the following summary was made: --

## INSECTS.

Little damage from insects is reported. The potato beetle is most frequently complained of, but is nearly through working. Grasshoppers are reported as doing damage to pastures and mowings in some sections. The horn fly is very troublesome in many localities, and other flies seem to trouble domestic animals more than usual. Other insects reported to be doing more or less damage are currant worms, cutworms, the curculio, the onion maggot, white grubs, cabbage worms, the pear-tree psylla, the striped squash bug, the squash-vine borer, wire worms and the cranberry fire worm.

## INDIAN CORN.

Indian corn is almost universally reported as being in excellent condition. Many correspondents speak of it as never better. The present indications are that one of the best crops for many years will be harvested. About the usual amount will be put into the silo, probably a little more than last year, as the silo appears to be gaining slowly in public favor. The amount varies, some reporting none, while others say that nearly the whole crop will be so used.

## THE HAY CROP.

The rains materially helped the hay crop, but did not come early enough to bring it up to the average. A conservative estimate would put it at three-fourths of an average crop. Much of that cut early was damaged by rain. Otherwise the quality seems to have been excellent as a rule.

## FORAGE CROPS.

The experience of the past two years has led many farmers to plant some forage crop as a supplement to the hay crop and the pasture. This year the dryness of the early summer was such that undoubtedly more than the usual amount of forage crops has been planted. Among these, fodder corn easily takes first place, and is most universally grown. Then oats, barley, Hungarian grass and millet follow in the order named, being quite extensively grown. Other crops grown, but not extensively, are rye, oats and peas, oats and barley,

turnips, cow peas, cabbage and wheat. All fodder crops are almost universally reported as in good condition.

#### MARKET-GARDEN CROPS.

Market-garden crops generally have improved with the rains and are now about average. The tendency of prices seems to be generally lower throughout the State. Particularly is this true of the market-garden counties of Middlesex and Essex. The correspondent for Winchester says, "Some crops will not pay for the labor of raising, throwing in the manure and the use of the land."

#### EARLY POTATOES.

Not many early potatoes have been dug as yet, but they are reported as looking finely and generally promising a good crop. Prices are fair, though where many have been dug the large crop operates to cut down the price. But two correspondents speak of blight, and only one of rot.

#### FRUITS.

Apples will be, on the whole, considerably less than half a crop, many correspondents reporting none or very few. Pears promise a fair but not large crop. Peaches now promise a good average crop in most localities. Quinces generally look well. Grapes bid fair to be an unusually heavy crop. Cranberries promise an average crop, good reports coming from the region of commercial production.

#### PASTURAGE.

Pastures have improved very much during the month, and in eastern and central sections are generally in good condition. Throughout the four western counties, however, they did not fully recover from the drought of the early summer, and where not yet short are now again in need of rain.

#### GRAIN CROPS.

Rye was, on the whole, a good average crop, many speaking of it as excellent. Oats appear to be an excellent crop, considerably above average; only one complaint of rust. Barley, where grown, is a full average crop.

## NOTES OF CORRESPONDENTS.

(Returned to us July 25.)

## BERKSHIRE COUNTY.

*Egremont* (J. H. ROWLEY). — Potato bugs are doing some damage. Indian corn never looked more promising; about one-fourth will be put into the silo. The hay crop was less in quantity and of better quality than in former years. Corn is raised to supplement the hay crop, and is in good condition. Market-garden crops injured by drought; prices about as last year. Fruit nearly a failure. Pastures are short and brown. Rye better than last year. Oats injured some by black rust. Barley not as good as last year.

*Monterey* (WM. S. BIDWELL). — Potato bugs are doing some damage. Corn in good condition; about one-half will be put into the silo. The hay crop was larger and better than last year. Fodder corn is raised to supplement the hay crop, and is in good condition. All market-garden crops are doing well; prices low. There will be some apples and pears. Pasturage in fine condition. Rye, oats and barley better than usual.

*Becket* (WM. H. SNOW). — Potato bugs are doing some damage. Corn is looking finely; one-half will be put into the silo. Quality of hay good, quantity about one-half short. Hungarian grass and oats are raised to supplement the hay crop. Potatoes promise a large crop. The prospect for apples and pears is not very good. Rye, oats and barley are fully as good as usual.

*Windsor* (H. A. FORD). — Grasshoppers and potato bugs are doing some damage. Condition of Indian corn good; not much put into the silo. Hay not over a three-fourths crop, of poor quality. Barley and millet are raised to supplement the hay crop. Market-garden crops in good condition, but very few harvested as yet. Apples a small crop. Pastures are getting short, owing to drought and grasshoppers. Rye, oats and barley look well.

*Williamstown* (S. A. HICKOX). — Potato bugs are doing some damage. Corn stands well and is in excellent condition; perhaps one per cent will be ensiled. Hay a three-fourths crop, of good

quality. Oats, barley, sweet corn and Hungarian grass are the principal forage crops grown. Market-garden crops in very good condition. Apples 70 per cent of a full crop, and pears half a crop. Pastures are very short. Oats and barley are fine and will help fill the gap left by the short hay crop.

#### FRANKLIN COUNTY.

*Colrain* (A. A. SMITH). — Grasshoppers and potato bugs are doing some damage. Indian corn in A No. 1 condition; fully one-half will go into the silo. Hay a three-fourths crop, of full average quality. Corn, barley and Hungarian grass are the principal fodder crops, and are all in fine condition. The prospect for all kinds of fruit is poor. Pasturage is fresh and green. Rye, oats and barley are above the average.

*Buckland* (J. D. AVERY). — Potato bugs are doing some damage. Corn never looked better; probably 15 per cent will be put into the silo. Hay 85 per cent of a full crop, of very good quality. Oats, barley and Hungarian grass are raised to help out the hay crop, and are all doing finely. The potato crop is promising, but more rain is needed. Apples and peaches will be light crops. Some orchards will give a full yield of apples, while others are almost bare of fruit. Pasturage is very good.

*Conway* (J. C. NEWHALL). — Potato bugs and cutworms have been very plenty, but grasshoppers are getting very thick now. Indian corn never looked better; only a small proportion will go into the silo. Since the middle of June the hay crop has gained, and on rich land there will be a fair crop. Barley and fodder corn are sown for forage. Potatoes are late, but looking well. Hardly any apples; pears, peaches, quinces and grapes will be average crops. Pastures have been good, but need rain. Rye, oats and barley are hardly up to the average.

*Sunderland* (J. M. J. LEGATE). — Potato bugs are the only insects doing damage, and they are nearly through. Corn is looking splendidly; a third will go into the silo. The hay crop was below the average, and most of it has been injured in harvesting. Sweet corn is the principal forage crop grown, and is looking well. Potatoes never looked better. A fair but not heavy crop of apples and pears is promised. Pastures are now getting a little dry. Rye and oats have done well. No damage from hail or wind.

*New Salem* (DANIEL BALLARD). — Potato bugs and grasshoppers are quite numerous. Corn is looking finely; perhaps two per cent will be put into the silo. The rains have brought grass forward to average growth; quality good. Corn, oats and Hungarian grass are raised as fodder crops. Market-garden crops are

yielding well. Apples and peaches light; pears and quinces good; grapes heavy. Pastures are holding out finely. Rye, oats and barley have all made a fair yield.

#### HAMPSHIRE COUNTY.

*Greenwich* (WM. S. DOUGLAS). — Cutworms and currant worms are doing some damage. Indian corn in good condition. Hay a light crop, but a little better than last year. Fodder corn is the principal forage crop. Potatoes are looking finely. All kinds of fruit will be very light. Pastures are in better condition than last year at this season. Rye, winter-killed; oats are looking well.

*Belchertown* (H. C. WEST). — Potato bugs are doing much less damage than usual. Indian corn in very fine condition; very little will be put into the silo. Hay crop 25 per cent below average, but of good quality. Rye, oats, corn, barley and Hungarian grass are grown to supplement the hay crop. Market-garden crops in fair condition. Apples light, pears good, peaches fair, quinces fair and grapes fine. Pasturage is short, but much improved by late rains. Rye, oats and barley above the average of former years. All crops growing very fast.

*Hadley* (H. C. RUSSELL). — Potato bugs are doing some damage. Corn never looked better; a small per cent will be put into the silo. Hay crop 20 per cent less than usual, and too ripe when cut. Fodder corn is the principal forage crop. Market-garden crops are in good condition; potatoes are coming into the market, and the price is falling. Apples are fair, and peaches a good crop. Pastures short, not having recovered from the drought. Rye, oats and barley about average crops.

*Southampton* (C. B. LYMAN). — The potato bug is doing some damage. Corn is looking first rate; a small proportion will be put into the silo. Hay about a two-thirds crop; quality fair, though somewhat injured by wet weather. Early potatoes yielding fairly well; price about the same as last year. Hungarian grass and fodder corn are the principal forage crops, and are in fair condition. Apples a fair crop; pears, peaches and grapes good. Pastures in better condition than last year. Rye and oats full crops.

*Chesterfield* (HORATIO BISBEE). — Potato bugs are doing some damage. Corn in fine condition; not more than one-fifth will go into the silo. Hay a three-fourths crop of fair quality. Corn, oats and barley are the principal forage crops; condition of corn good, oats fair. The apple crop will be fair, but not large. Rowen has started well, and pastures are producing plenty of feed. Rye, oats and barley compare well with former years.

## HAMPDEN COUNTY.

*Blandford* (E. W. BOISE). — There are some potato bugs and horn flies are very plenty. Indian corn extra good ; a small amount will be put into the silo. Hay 80 per cent of an average crop, of average quality. Fodder corn, oats, peas and Hungarian grass are the principal forage crops. Market-garden crops about average. Potatoes of good size, but a small yield. Apples have looked well, but are now dropping badly. Pastures are in poor condition, not having recovered from the early drought. Full average stand of oats, and barley very heavy. The season has been very bad for haying, and few are through yet.

*Westfield* (C. F. FOWLER). — Cutworms have been very plenty and the potato bug is ever present. Indian corn above the average in condition. The hay crop is from 15 to 20 per cent short, and the early cut was injured by rain. Corn, millet and Hungarian grass are the principal forage crops, and are looking well. Drought injured potatoes, and the yield will be light. Apples a three-fourths crop ; pears and peaches full crops ; quinces light ; grapes half a crop. Pasturage is very good since the rains. Rye not over a three-fourths crop.

*West Springfield* (T. A. ROGERS). — Potato bugs and the horn fly are doing the most damage. Corn is looking well ; not over two per cent will be put into the silo. Hay is fully an average crop, having gained a third during the month. Oats and fodder corn are raised to supplement the hay crop, and are doing remarkably well. Garden crops generally good ; potatoes never looked better. Apples are below the average. Pastures are improved, but still thin. Rye and oats have done well.

*Wilbraham* (F. E. CLARK). — Potato bugs have been very plenty. Indian corn is growing very fast since the late rains. Hay on old fields very light, elsewhere a full average. Oats and peas, oats and barley, sweet corn and Southern corn, are the principal forage crops ; barley will be sown next month for late soiling. Potatoes promise a good yield. Apples half a crop ; pears a full crop ; peaches half a crop ; quinces and grapes a good average. Pasturage is much improved and is now average. Rye a good crop, and oats above average.

*Hampden* (JOHN N. ISHAM). — Horn flies are numerous. Corn is in excellent condition and growing fast ; one-fortieth of the crop will be put into the silo. Hay is a light crop of good quality. Corn, with some oats and barley, is the principal forage crop and is doing well. Potatoes never looked better. Winter apples a light crop ; other fruits good. Pastures green and in good condition. Rye below average ; oats in fine condition.

## WORCESTER COUNTY.

*West Brookfield* (L. H. CHAMBERLAIN). — Potato bugs are doing some damage. Indian corn was never in better condition. Hay 85 per cent of a full crop; quality 100. Barley, cow peas, millet, Hungarian grass and corn fodder are the forage crops grown; all in first-class condition. Garden crops are very fine. Apples one-fourth a full crop; pears full crop; peaches a total failure; no quinces; grapes good; no cranberries. Rye, oats and barley first class. The second growth of grass is starting better than for years.

*Spencer* (H. H. KINGSBURY). — Corn has made a great growth during the past week, but some fields have been injured by hail and wind. Hay 90 per cent of a full crop; quality excellent where not damaged by rain. Corn and millet are raised as forage crops, and are growing very fast. Market-garden crops very thrifty; prices about average. Apples one-fourth of a crop; pears, peaches and grapes very plenty; very few cranberries, owing to drought. Pasturage in excellent condition. Oats and barley above the average.

*Dana* (E. A. ALBEE). — Potato bugs are doing some damage. Corn in good condition; no silos in town. Hay, as last year, about a three-fourths crop. Fodder corn and oats are raised to supplement the hay crop, and are looking well. Market-garden crops in good condition; prices about as last year. No fruit of any kind. Pasturage in good condition. Rye, oats and barley average crops. There has been so much wet weather that the hay crop is not more than half gathered.

*Westminster* (I. DICKINSON). — Potato bugs are doing some damage. Indian corn in good condition; a very small amount will be put into the silo. Hay is about a two-thirds crop, and that first cut was badly damaged. Corn stover, barley and Hungarian grass are the principal forage crops. Market-garden crops are in first-class condition. The prospect for all kinds of fruit is poor. Pasturage is in very good condition. Rye, oats and barley above the average. Rowen starting well.

*Bolton* (II. F. HAYNES). — Potato bugs are doing some damage. Corn never better; perhaps 8 per cent of the crop will go into the silo. Hay possibly 65 per cent of a full crop, of poorer quality than usual. Golden millet is the principal crop grown to supplement the hay crop. Early potatoes are looking finely, though few have been dug yet. All fruit, except peaches, a failure; peaches a good crop. Pastures are much improved. Nearly all the rye, oats and barley are cut green for hay.



*Worcester* (S. A. BURGESS). — Potato bugs, cutworms, cabbage worms and white grubs are doing some damage. Corn in good condition; none will be put into the silo. Hay an average crop of rather poor quality. Sweet corn, oats, barley, rye, wheat, cabbage and turnips are raised to supplement the hay crop, and all look well. Market-garden crops a fair average in yield and price. Very few apples; pears and peaches good; grapes abundant. Pasturage quite good. Rye, oats and barley about average.

*Southborough* (E. F. COLLINS). — Horn flies are somewhat troublesome. Corn was never better; one-sixth will be put into the silo. Hay 90 per cent of a full crop, of good quality. Fodder corn, Hungarian grass, barley and turnips are the principal forage crops, and are all in good condition. Potatoes and other crops promise well; price for potatoes lower than usual. Pears and peaches a good crop; apples few. Pasturage looking better than usual. Rye, oats and barley are all cut for hay.

*Sutton* (O. P. JOHNSON). — Potato bugs and horn flies are doing some damage. Indian corn never looked better. Hay is about an average crop, but varies greatly on different fields. Fodder corn is the principal crop used to supplement the hay crop, and is looking well. Market-garden crops good, prices low. Potatoes are looking well. Apples few; pears and peaches good; quinces, grapes and cranberries average. Pastures are in splendid condition. Rye, oats and barley about average.

#### MIDDLESEX COUNTY.

*Sherborn* (N. B. DOUGLAS). — Potato bugs, horn flies and horse flies are very troublesome. Corn looks extremely well; 10 per cent will cover all that will go into the silo. Hay two-thirds of an average crop; quality never better. Barley, oats, Hungarian grass and corn are raised to supplement the hay crop, and all promise full crops. Potatoes not yet dug. Very light crop of apples and grapes; peaches a full crop; pears a half crop. Pastures are above the average at this season. Oats a large crop.

*Littleton* (G. W. SANDERSON). — Corn in excellent condition; about one-fourth will be put into the silo. Late rains have helped the hay crop so that it will compare favorably with former years. Hungarian grass, millet, barley and sweet corn have been sown in large quantities and are looking well. Potatoes are looking well and prices good. Few apples; fair crop of pears; peaches good; quinces, grapes and cranberries small crops. Pasturage in good condition. Rye, oats and barley about average.

*Lowell* (C. L. MARSHALL). — The potato beetle and onion maggot are doing some damage. Corn in very good condition; nearly

the whole crop will be put into the silo. Hay crop about two-thirds of an average and quality good. Hungarian grass is the principal forage crop and is in fine condition. Market-garden crops generally low in price; yield good. Apples a fair crop; pears, peaches and grapes promise finely. Pasturage in excellent condition. Rye, oats and barley are a small yield and not well filled out.

*Winchester* (MARSHALL SYMMES). — Hay a good crop though somewhat injured by wet weather while drying. All market-garden crops good; prices very low indeed. Large crop of pears; not many apples. Pastures are fresh and green. Rye is a good crop. Owing to low prices some market-garden crops will not pay for the labor of raising, throwing in the manure and the use of the land.

*Weston* (H. L. BROWN). — Very little corn raised, but what there is is looking finely. Hay an average crop, but not of good quality. Millet and barley are the principal forage crops; millet is looking well, and barley is just being sown. Market-garden crops in good condition; no potatoes yet harvested, others sell very low. Fall apples plenty; pears plenty; few peaches; very few grapes; cranberries in blossom. Pasturage in good condition. Rowen has a good start and is looking finely.

#### ESSEX COUNTY.

*Haverhill* (EBENEZER WEBSTER). — Potato bugs are doing some damage. Corn in good condition; about one-third of the crop will go into the silo. Hay about an average crop, of good quality. Corn, oats and barley are raised to supplement the hay crop, and are in good condition. Market-garden crops fair in yield and price. Pears and grapes a medium crop. Pasturage is good since the late rains. Rye, oats and barley are fully equal to former years. Much of the corn grown here is fed green to cattle.

*West Newbury* (J. C. TARLETON). — Potato bugs are very numerous this year. Corn is very good and forward; not two per cent will be put in the silo. Hay a two-thirds crop, of only fair quality. Barley, Hungarian grass, fodder corn and oats are the principal forage crops; condition better than a month ago. Market-garden crops are very good. Potatoes below last year in yield and price. Apples very poor; pears good; no peaches; quinces, grapes and cranberries good crops. Pasturage in very good condition. Rye, oats and barley about average; mostly used for fodder.

*Topsfield* (B. P. PIKE). — Horn flies are doing some damage. Corn never looked better; five per cent will be put into the silo.

Hay crop below average in quantity and badly damaged. Corn, Hungarian grass and barley are the principal crops raised to supplement the hay crop. Condition of market-garden crops excellent; prices a little lower than usual. Apples very scarce; other fruit fair. Pasturage in very good condition. Rye, oats and barley very good crops.

*Marblehead* (WM. S. PHILLIPS, JR.). — Corn in fair condition; a large part of the crop will be put into the silo. Hay is about half the usual crop, and the quality is not extra. Oats and peas, and fodder corn are the principal forage crops and are in good condition. Garden truck is looking very well, but little sold as yet. Fruit crop rather light. Pasturage is at present in very good condition.

#### NORFOLK COUNTY.

*Medfield* (GEO. R. CHASE). — Indian corn is above the average in condition; about two and a half per cent will be put into the silo. Hay about 70 per cent of a full crop; quality poor on account of rain. Oats and peas are the principal forage crops and are in good condition. Potatoes are good, and other market-garden crops average. The prospect for all kinds of fruit is poor. Pasturage is below the average in condition. Rye, oats and barley are more than average crops.

#### BRISTOL COUNTY.

*Mansfield* (WM. C. WINTER). — The curenlio has done the most damage. Corn is looking well; no silos in town. Hay at least 20 per cent below average crop, and quality poor owing to rain. Sweet corn is the principal forage crop, and is in good condition. Market-garden crops in good condition, and prices somewhat higher than in former years. Apples a one-fourth crop; pears a two-thirds crop; peaches 10 per cent; quinces good; grapes a one-third crop; cranberries uncertain. Pasturage is now in fine condition. Rye, oats and barley about two-thirds crop.

*Swansey* (JOSEPH GIBBS). — Potato bugs are doing some damage. Corn promises a full crop; no silos here. Hay a full crop, but damaged by wet weather. Fodder corn and oats are the principal crops raised to supplement the hay crop. Potatoes have blasted badly and are rotting on low ground, so the crop will be light, and if the rot is not checked will be a total failure. Market-garden crops are good, but prices rule low. Peaches a full crop, and apples 25 per cent of a full crop. Pasturage in good condition. Rye, oats and barley full average crops.

*Dartmouth* (L. T. DAVIS). — Potato bugs are doing some dam-

age. Indian corn in very good condition; perhaps one-third will go into the silo. Quantity of hay crop about as usual, quality not the best. Oats, barley, millet and corn are the principal forage crops, and are in good condition. Market-garden crops fair; potatoes good, but rotting; price about as usual. Fruit crop not over one-third the average. Pasturage in very good condition. Rye well filled out, oats badly lodged, barley fair.

#### PLYMOUTH COUNTY.

*West Bridgewater* (F. E. HOWARD). — Indian corn in good condition; probably much less than half the crop will go into the silo. Hay crop less in quantity and poorer in quality than usual. Corn, barley, oats and millet are raised to supplement the hay crop, and are in good condition. Market-garden crops are lighter and prices lower than last year. Prospect for apples very poor indeed; pears, peaches, quinces and grapes promise well; cranberries poor. Pasturage is now in good condition. Rye, oats and barley good crops.

*Halifax* (G. W. HAYWARD). — Potato bugs are doing some damage. Corn never looked better; no silos in town or near here. Hay crop light in quantity, but of good quality where it was not injured in curing. Fodder corn is the stand-by as a forage crop. Potatoes are looking finely. Some apples; pears and peaches good; grapes late. Pasturage in better condition than usual at this time of year. Rye, oats and barley not raised except for fodder.

*Wareham* (A. B. SAVARY). — Corn in rather better condition than usual; no silos. Hay about 20 per cent larger crop than common, and of good quality. A little fodder corn is raised to supplement the hay crop, and is doing well. Market-garden crops rather above the average, and prices same as usual. Few apples, pears or peaches; prospect good for grapes, and fair for cranberries. Pasturage is better than common. Rye, oats and barley are 25 per cent above the average crops.

#### BARNSTABLE COUNTY.

*Falmouth* (D. R. WICKS). — Potato bugs are doing a little damage. Corn is looking well; nine-tenths of the crop will be put into the silo or fed green. Hay a full average crop but somewhat damaged by bad weather. Corn is the principal forage crop. Market-garden crops fair; potatoes are good, but are being attacked by blight and by the flea beetle. Apples are about a failure; pears good; peaches, quinces and grapes fair. Pasturage never was better. Rye, oats and barley are full average crops.

*Barnstable* (JOHN BURSLEY). — Fire worms are damaging cran-

berries, and wire worms attacking corn. Flies of all description are troublesome to domestic animals. Corn is rather backward; none will be put in the silo. Hay crop rather below the average in quantity, and quality poor. Corn, oats and Hungarian grass are the principal forage crops and are in good condition. Potatoes are looking well. Apples, pears, peaches and quinces will be light; grapes and cranberries look well. Pasturage is very good. Rye and oats are very good crops.

*Brewster* (J. H. CLARK). — Cranberry worms are doing some damage. Corn is in very good condition; perhaps one-eighth will be put into the silo. Hay rather better than an average in quantity and quality. Market-garden crops are very good indeed, and prices are better than the average. Very few apples; prospect good for other fruit. Pasturage in very good condition. Rye, oats and barley very good crops.

*Eastham* (J. A. CLARK). — The horn fly is somewhat troublesome. Indian corn looks well; none will be put into the silo. Hay light on uplands and fairly good on low land; salt meadows look well. Potatoes are an extra good crop. Asparagus is the only market-garden crop yet harvested; prices not quite so good as last year. Apples light; cranberries looking well. Pastures are in fair condition.

#### DUKES COUNTY.

*West Tisbury* (GEO. HUNT LUCE). — Potato bugs are doing some damage. Indian corn is in good condition; we have no silos. Hay crop above average in quantity but below in quality. Those market-garden crops harvested yield well with prices fair. Apples are poor and grapes good. Pastures are in very good condition. Oats are larger and of better quality than usual.

#### NANTUCKET COUNTY.

*Nantucket* (CHAS. W. GARDNER). — Potato bugs and cutworms are doing some damage. Corn is looking very well. Hay was a two-thirds crop on old land, but very heavy on new land; it has been hard to make it in good shape. Corn is the principal forage crop, and is looking very well. Garden crops never looked better; potatoes look finely, but have commenced to blast. Pasturage is in first-class condition. Oats are a splendid crop.

BULLETIN OF  
MASSACHUSETTS BOARD OF AGRICULTURE.

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BY E. H. FORBUSH, ORNITHOLOGIST TO THE BOARD.

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BIRDS AS PROTECTORS OF ORCHARDS.

Having had, during the last twenty years, some opportunity for observing the food habits of birds, I have become convinced that they destroy enormous numbers of insects. This conviction gives rise to the question, to what extent are birds useful to man in this respect?

The present paper is merely a partial record of the results of an attempt to foster and protect birds in an old and neglected orchard with a view to observing the effect of such a policy upon the trees. The orchard is so situated as to be a favorite haunt for birds. It forms part of an estate in Medford, Mass., lying near the southern border of the stretch of wooded rocky hills known as the "Middlesex Fells," a large part of which is now under the control of the Metropolitan Park Commission of Massachusetts, and is being administered as a forest reservation. The nearest estates on the east and west of the orchard are cultivated to some extent. There are other orchards in the immediate vicinity, and many large and fine shade trees. There are also on the estate in question many varieties of trees and shrubs. There is a small piece of woodland, covering perhaps an acre and a half, in which yellow pine predominates, the other trees being principally ash, oak and maple, some hickory and a few white pines. A lane running along the southern border of the estate is bordered on both sides with elms and poplars. A line of mulberry-trees along the lane south of the orchard affords tempting food for such birds as are fond of fruit in its season. There are also many wild cherries and berries of several varieties, together with half a dozen trees of cultivated cherries.

Among the trees, shrubs and vines found on the estate and which furnish food for birds in the shape of berries or seeds at certain seasons of the year are the *Berberis vulgaris* (common barberry), *Vitis labrusca* (Northern fox grape), *Rhus toxicodendron* (poison

ivy), *Prunus americana* (wild yellow plum), *Prunus pennsylvanica* (wild red cherry), *Prunus virginiana* (choke-cherry), *Prunus avium* (English cherry), *Rubus occidentalis* (black raspberry), *Rubus villosus* (high blackberry), *Rubus idaeus* (garden raspberry), *Rosa nitida* (wild rose), *Pyrus malus* (common apple), *Ribes rubrum* (common red currant), *Fraxinus americana* (white ash), *Morus rubra* (red mulberry), *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Pinus strobus* (white pine), *Pinus rigida* (pitch pine), *Tsuga canadensis* (hemlock), *Juniperus virginiana* (red cedar).

The orchard itself is a typical old orchard, such as is often found on small farms. It has suffered greatly from neglect. Two-thirds of the original trees have died or are in the last stages of dissolution. This is largely the result of neglect and improper pruning. Dead limbs and hollows in the trees have offered nesting places for such birds as the wren, woodpecker and bluebird.

For three years, from 1891 to 1893, inclusive, the trees were trimmed and cared for. They were sprayed or banded to protect them from canker-worms, and the "nests" of the tent caterpillar (*Clisiocampa americana*) were removed. The result was a scanty yield of apples from most of the trees. One or two bore quite plentifully.

In order to observe the effect of the feeding of birds in the orchard, no care was taken in 1894 to protect the trees. During that year the tent caterpillars were very numerous in the vicinity, and it became evident also that a great increase in the number of canker-worms was taking place in the neighborhood. Although these insects made considerable inroads upon the trees, they did not seriously injure the foliage anywhere except in one or two instances. No attempt had been made previous to 1895 to foster or encourage the birds in the neighborhood, except that a few nesting boxes were put up in 1894, which were occupied in one case by a family of wrens and in another by the English or house sparrow. We were careful, however, to destroy the nests of the house sparrow.

In the fall of 1894 it was noticed that immense numbers of the wingless females of the fall canker-worm (*Anisopteryx pomataria*) were ascending nearly all the trees and depositing their eggs; also, that the eggs of the tent caterpillar moths were numerous upon the twigs, promising a plentiful supply for 1895.

Having allowed the insects one year to increase unmolested by man, we began in the winter of 1894-95 to encourage the presence of birds in the orchard.

In 1894 a small tree in the centre of the orchard had been enclosed by a high board fence. The tree thus enclosed was used as

an out-door experiment station for observations on the breeding and habits of the gypsy moth. During the winter of 1894-95, Mr. C. E. Bailey made frequent visits to this tree to ascertain whether or not the birds were destroying the eggs of the gypsy moth. Incidentally, Mr. Bailey observed many interesting things in connection with the feeding of birds on the eggs, larvæ and pupæ of insects which winter on the trees, and I am greatly indebted to him for many interesting notes on the feeding of birds in this orchard. He is a careful, conscientious observer, and is intimately acquainted with most of our native land birds.

Hunters and trappers are aware that many species of winter birds, such as titmice, woodpeckers, crows, jays and nuthatches are attracted by a skinned carcass suspended from a limb, and will remain in the vicinity until all the bones are picked clean or until, with the approach of spring, insect food becomes more accessible.

Believing from my own observations that the chickadees (*Parus atricapillus*) were feeding on the eggs of the fall canker-worm, I asked Mr. Bailey to attract the birds, if possible, to the orchard by suspending pieces of meat, bone, suet, etc., from the trees. These food materials are suitable for birds at times when the trees are covered with snow or ice and, when lacking such nourishment, they might starve. Although birds will frequently visit bait provided for them and in time will eat a considerable portion of the meat, they do not depend entirely on this aliment, but spend the greater portion of their time in searching for insects and eggs in the immediate vicinity.

Finding a plentiful supply of food, the chickadees remained about the orchard most of the winter, except for a week or two, when the meat gave out, but they were lured back again later by a fresh supply which was placed in the trees. Not only were the chickadees attracted to the orchard in large numbers, but other birds came also. A pair of downy woodpeckers (*Dryobates pubescens*) and two pairs of nuthatches (*Sitta carolinensis*) were frequent visitors, and a few brown creepers (*Certhia americana*) came occasionally. All these paid frequent visits to the meat and suet, and also thoroughly inspected the trees in search of insect food. They made excursions also to the trees in the neighborhood, but the greater portion of their attention was confined to the orchard in which the bait was suspended. As they became more accustomed to Mr. Bailey's presence, they grew quite tame and could be viewed at a distance of a few feet. Indeed, chickadees frequently alighted on his person and occasionally took food from his hand. He was thus enabled to determine accurately (without killing them) what they were feeding upon, and was soon convinced that they were destroying the eggs of the canker-worm moth in



large numbers, as well as the hibernating larvæ and pupæ of other insects injurious to trees.

To determine how many eggs a single chickadee would eat, a few birds were killed and their stomach contents examined, with surprising results. There was no difficulty in identifying the eggs of the canker-worm moth which were found in the birds' stomachs, as a great portion of the shells remained intact. The other insect contents of the stomachs were identified for me through the kindness of Mr. A. H. Kirkland, B. Sc., assistant entomologist to the State Board of Agriculture, who made the examinations. Although it was impossible in all cases to learn with certainty the species to which certain insects belonged, it was evident that they belonged to genera known to be of injurious habits.

I take the following from Mr. Bailey's notes :—

*Number of Eggs of the full Canker-worm found in Stomachs of Chickadees.*

No. 1,	.	.	.	.	.	.	.	.	.	273 eggs.
" 2,	.	.	.	.	.	.	.	.	.	261 "
" 3,	.	.	.	.	.	.	.	.	.	216 "
" 4,	.	.	.	.	.	.	.	.	.	278 "

Making in all 1,028 eggs found in the stomachs of four birds. Four birds killed later in the season had eaten the female imagos of the spring canker-worm (*Paleacrita vernata*) as follows :—

No. 1,	.	.	.	.	.	.	.	.	.	41 moths.
" 2,	.	.	.	.	.	.	.	.	.	18 "
" 3,	.	.	.	.	.	.	.	.	.	27 "
" 4,	.	.	.	.	.	.	.	.	.	19 "

Making a total of 105. In Nos. 2, 3 and 4 of the last table there were a large number of eggs also. It is safe to say that there were 150 eggs in each stomach, in addition to the female moths eaten.

Mr. Bailey carefully counted the eggs in the ovaries of twenty of these female moths, with the following results :—

No. 1,	.	.	.	.	158	No. 11,	.	.	.	.	111
" 2,	.	.	.	.	272	" 12,	.	.	.	.	160
" 3,	.	.	.	.	127	" 13,	.	.	.	.	193
" 4,	.	.	.	.	184	" 14,	.	.	.	.	131
" 5,	.	.	.	.	213	" 15,	.	.	.	.	281
" 6,	.	.	.	.	135	" 16,	.	.	.	.	242
" 7,	.	.	.	.	140	" 17,	.	.	.	.	116
" 8,	.	.	.	.	220	" 18,	.	.	.	.	281
" 9,	.	.	.	.	200	" 19,	.	.	.	.	192
" 10,	.	.	.	.	130	" 20,	.	.	.	.	217

It will be seen from this table that the average number of eggs found in each moth is 185. Mr. Bailey is very positive, from his continuous field observations, that each chickadee will devour on the average 30 female canker-worm moths per day from the 20th of March until the 15th of April, provided these insects are plentiful. If the average number of eggs laid by each female is 185, one chickadee would thus destroy in one day 5,550 eggs; and in the twenty-five days in which the canker-worm moths "run" or crawl up the trees, 138,750. It may be thought that this computation is excessive, and it is probable that some of the moths were not captured until they had laid some of their eggs, but the chickadees are also busy eating these eggs. When we consider further that 41 of these insects, distended as they were with eggs, were found at one time in the stomach of one chickadee, and that the digestion of the bird is so rapid that its stomach was probably filled several times daily, the estimate made by Mr. Bailey seems a very conservative one. He now regards the chickadee as the best friend the farmer has, for the reason that it is with him all the year, and there is no bird that can compare with it in destroying the female moths and their eggs. It was noticed that the birds made no attempt to catch the male moths. This, however, cannot be considered as a fault, for the birds accomplish far more by destroying the females than they would by killing males.

The following notes from the preliminary examinations of the contents of the alimentary canal of chickadees made by Mr. Kirkland are of interest in this connection:—

"Bird brought in by Mr. Bailey, March 16, 1895: Gullet empty. Gizzard contained 270 canker-worm eggs (*Anisopteryx pomataria*), 46 case-bearers (microlepidoptera), 6 cocoons of a small tineid (near *Aspidisca*). These three kinds of food in bulk composed 80 per cent of the gizzard contents, the remainder being dark material which I was unable to determine under a hand lens. I think it very probable that part of this was bits of bark or particles of bark-dust taken in with the eggs or cocoons. The intestine contained a large quantity of meat, 75 per cent, and 103 canker-worm eggs, 10 per cent, the remainder, 15 per cent, being material which I could not identify. It was not meat. This gives us as totals, 373 canker-worm eggs and 52 microlepidoptera.

"Specimen of so-called 'scales' on apple twigs brought in by Mr. Bailey, March 12, 1895. These are not bark lice, but the cocoons of a microlepidopteron, probably a tineid. Length,  $\frac{1}{12}$  to  $\frac{1}{8}$  inch; width,  $\frac{1}{12}$  to  $\frac{1}{6}$  inch; elliptical, dark brown or reddish brown. They are closely spun, the upper surface apparently being of leaf epidermis, while underneath is a small, well-formed cocoon which

contains a minute green larva which evidently hibernates as such, probably pupating in the spring. The larva undoubtedly feeds on the leaves of the apple-tree, as these cocoons were taken from the small twigs at the extreme end of a large branch. Some of these cocoons are empty and have a minute hole at one end, which probably served for the egress of some small parasite. These cocoons are eaten by the chickadee, and have been found in the gizzards of the birds."

The case-bearers and the tineids or leaf miners are injurious to the foliage of the apple-trees.

It was noticed by Mr. Bailey, who watched the birds closely for several days, that they were eating quantities of both of these insects. It would have been impossible for any one to determine the species of the leaf miners as found in the birds' stomachs, for little remained but small fragments of the shell of the creature. Mr. Bailey noticed that the birds were taking objects from the twigs, some of which they ate; others they rejected and dropped upon the snow. Some of those dropped he picked up and examined, finding them to be parasitized. The birds undoubtedly ate only those which were alive.

It was evident from a careful examination of the eggs found in the stomachs of the chickadees that they were either broken by the bill in such a way that the contents were exposed to the action of the gastric juice or the gastric fluid destroyed a portion of the shell. Occasionally a few eggs which appeared to be whole were found in the intestines.

A great quantity of animal food is required to sustain life and provide animal heat sufficient to enable these little birds to resist the inclemency of our severe winters. In proof of this it may be stated that during favorable weather the birds visited the meat and ate largely of it three times each hour with fair regularity. During each interval they were occupied in destroying eggs and other hibernating insect forms which were always present and numerous in the stomachs examined. This feeding appeared to be almost continuous except in severe storms when the birds sought shelter or when they were laboring under excitement caused by fear, as in the case of a visit from a hawk, cat or shrike. Whenever a cat appeared they immediately hid behind the branches and remained quiet until the intruder had passed. The appearance of other enemies or the firing of a gun would produce much the same effect.

The woodpeckers and nuthatches which frequented the orchards were not seen to eat the eggs of the canker-worm moth. As they were not numerous, none were killed. Mr. Bailey observed, how-

ever, that the nuthatches were eating many scales which they found on the limbs of the apple-trees in a neighboring orchard. In relation to these scales the following note from Mr. Kirkland is of interest:—

“March 20, 1895. Mr. Bailey brought in specimens of apple twigs infested with the bark scale louse, *Mytilaspis pomorum*. He reported that the nuthatch was feeding on them. These twigs were infested in a worse manner than I have ever seen before. They were literally covered with the scales. On one small twig, one-half inch in diameter, I counted 367 scales on one inch of the twig. The eggs contained in a number of scales varied from 62 to 83, with an average of 70.”

These scales, when numerous, are very injurious to the apple-tree. Each scale covered a dead female of the preceding year and the hibernating eggs, many of which must have been disposed of by the nuthatches. It was shown, both by observation and dissection, that birds feeding in the same neighborhood and upon the same trees showed considerable variance in the character of their food. Kinglets taken had no canker-worm eggs, but had eaten largely of bark borers. Woodpeckers seemed to confine themselves to the larvæ of borers and to wood-ants and other insects which bore into the wood of the tree. Chickadees and nuthatches ate the pupæ and eggs of insects found upon the bark or in the crevices of the trunks. No birds were seen to eat the eggs of the tent caterpillar, nor were any found in the stomachs of any of the birds examined. It seems probable that these eggs are so protected by a hard covering that they are not eaten by most birds.

It is impossible, in the limited space at our command, to give results of all observations and dissections in detail. We can merely give the apparent results of the presence of the birds in the orchard.

It was found that these birds were not only destroying the eggs of the canker-worm in this orchard, but were feeding on the eggs of the same insect in the woods where bait had been suspended.

As the frost left the ground on the first warm days of spring the wingless females of the spring canker-worm moth appeared in the orchard and began ascending the trees in great numbers. The chickadees commenced catching and eating the females and their eggs. Mr. Bailey placed twenty-two of the females on one tree, and in a few minutes twenty of them were captured and eaten by chickadees.

It was noticed as spring approached and insects became more numerous that the chickadees came very seldom to the meat. They were not as assiduous in their attention to the orchard, and a

small portion of their food consisted of the early gnats which were flying on bright sunny days. In early April they had nearly deserted the meat, although they still frequented the orchard in search of the female canker-worm moths. They seemed to prefer animal food to all other, and even in cold weather would hardly notice grain or seeds of any kind, though one individual ate a few oat kernels which were placed near his accustomed feed of meat.

Towards the last of April the English or house sparrow (*Passer domesticus*) began to make its appearance in the vicinity and apparently drove the chickadees to the woods, as they disappeared and did not nest in the orchard, but remained in the woods, where they paired and nested.

I believe that the English sparrow is largely responsible for the fact that chickadees are not now found nesting in our orchards. Though they still nest in the orchards on the remoter farms and in the villages where the English sparrow is not numerous, they seem to have disappeared in summer from orchards near cities. At the time of the advent of the sparrow in this locality, twenty-five years ago, chickadees were often found nesting in old apple-trees in the orchards in this region where now scarcely any are to be seen in orchards during the summer.

In the latter part of April and in early May the tent caterpillars made their appearance on the apple and cherry trees in the neighborhood. Canker-worms were also numerous on the apples and elms and appeared in some of the other trees. It was noticed, however, that while trees in neighboring orchards were seriously infested with canker-worms and to a less degree with tent caterpillars, those in the orchard which had been frequented by the chickadees during the winter and spring were not seriously infested and that comparatively few of the worms and caterpillars were to be found there.

With the warm south winds of May, many summer birds came and settled in the neighborhood, and prepared to build their nests, among which the following were seen: chickadee (*Parus atricapillus*), tree sparrow (*Spizella monticola*), crow (*Corvus americanus*), purple grackle (*Quiscalus quiscula*), flicker (*Colaptes auratus*), red-winged blackbird (*Agelaius phoeniceus*), robin (*Merula migratoria*), chipping sparrow (*Spizella socialis*), oven-bird (*Seiurus aurocapillus*), wood thrush (*Turdus mustelinus*), catbird (*Galeoscoptes carolinensis*), brown thrasher (*Harporhynchus rufus*), black-billed cuckoo (*Coccyzus erythrophthalmus*), yellow-billed cuckoo (*Coccyzus americanus*), black and white warbler (*Mniotilta varia*), yellow warbler (*Dendroica aestiva*), chestnut-sided warbler (*Dendroica pennsylvanica*), black-throated green war-

bler (*Dendroica virens*), pine warbler (*Dendroica vigorsii*), house wren (*Troglodytes ædon*), American redstart (*Setophaga ruticilla*), Nashville warbler (*Helminthophila ruficapilla*), golden-winged warbler (*Helminthophila chrysoptera*), scarlet tanager (*Piranga erythromelas*), rose-breasted grosbeak (*Habia ludoviciana*), Baltimore oriole (*Icterus galbula*), blue-jay (*Cyanocitta cristata*), least flycatcher (*Empidonax minimus*), wood pewee (*Contopus virens*), phoebe (*Sayornis phoebe*), kingbird (*Tyrannus tyrannus*), and downy woodpecker (*Dryobates pubescens*).

It was noticeable that early in the season, when the webs of the tent caterpillar first appeared on the apple and cherry trees, the orioles attacked them and devoured a considerable number of the hairy young larvæ. A little later, when the canker-worms became more numerous, it seemed as if all the birds in the neighborhood were intent on eating canker-worms, neglecting to a certain extent the hairy caterpillars. The cuckoos, however, seemed to feed impartially on both the canker-worm and the tent caterpillar.

Birds from all quarters in the wood and swamp, orchard and field, flocked into the trees infested by canker-worms, and there spent a considerable portion of their time. In a short time the few canker-worms remaining in the old orchard were apparently eaten by birds, and the birds then directed their attention to the neighboring orchards, which were swarming with the worms. It soon became evident that these orchards would be entirely stripped of their leaves, while the old orchard retained its full foliage. Thus it was seen that the trees to which the chickadees had been lured during the winter had been so well protected that the summer birds were able to destroy the few remaining larvæ, while the trees at a distance from these contained so many larvæ that the birds were not numerous enough to dispose of them or to make any effective reduction in their numbers. This apparently demonstrated the usefulness or the egg-destroying winter birds, and showed the wisdom of attracting them to the orchard during the winter months. Not only did nearly all species of birds in the neighborhood flock to the trees infested by the canker-worms, but the chickadees living in their retirement in the woods came out to the orchards, flying some distance to procure canker-worms with which to feed their young, and making regular trips to the infested trees day after day.

On May 18 Mr. Bailey saw a female chickadee carry twenty larvæ to its nest. They were apparently all canker-worms but two, which were tent caterpillars. Of this he is certain, for he was within three yards of the nest to which the larvæ were taken. Later, on May 31, he noticed the chickadees feeding their young.

It was evident that a large portion of the food consisted of canker-worms. The birds each made a trip to the nest about once in twelve minutes. The male and female came at nearly the same time and went away together. They went in the direction of an orchard infested by canker-worms. A few of the larvæ were dropped on the ground at the nest and proved, on examination, to be canker-worms.

The crow was also observed feeding on the canker-worms.

On May 22 the birds had nearly all stopped feeding in the neighboring woods and were in the orchards feeding on canker-worms.

Early in June, when the remaining canker-worms had finished their transformations and retired to the ground, several species of birds were again noticed feeding their young on the tent and other hairy caterpillars. Of these, three species (both cuckoos and the Baltimore oriole) seemed to be the most useful. On May 17 a cuckoo was seen to take eleven caterpillars out of one nest. Mr. Bailey writes: "On May 10 a black-billed cuckoo came into a tree near me at 3 P.M. and sat there until 4.40 P.M., then he went straight to a tent caterpillars' nest. He looked it over for a short time and then commenced eating the caterpillars. He picked twenty-seven caterpillars out of the nest before he stopped. The bird ate them all and did not drop one. Then he went to the tree in which I believe he remained during the night, for on Saturday, the 11th, I found the bird in the same tree and in almost the same place at 5 A.M."

The orioles, chickadees and vireos often pecked the caterpillars to pieces and ate portions of them, seemingly feeding to a considerable extent on the internal organs. This being the case, it is quite evident that the stomach contents cannot be depended upon entirely to determine the character of the food of these birds, as no one is expert enough to identify the internal organs of caterpillars with such certainty as to determine the species to which they belong.

The following is a list of the birds seen feeding on the tent caterpillar:—

Crow (*Corvus americanus*), chickadee (*Parus atricapillus*), oriole (*Icterus galbula*), red-eyed vireo (*Vireo olivaceus*), yellow-billed cuckoo (*Coccyzus americanus*), black-billed cuckoo (*Coccyzus erythrophthalmus*), chipping sparrow (*Spizella socialis*), yellow warbler (*Dendroica aestiva*).

During the month of May an attempt was made to render the place as attractive to birds as possible. The undergrowth, which previous to 1894 had been trimmed out, was afterward allowed to

grow, and in 1895 several low thickets had been thus formed; the mulberry-trees were stimulated by judicious trimming, and bore a considerable crop of early fruit which ripened in advance of the cherries, thus drawing the attention of the fruit-eating birds away from the cherries, and serving to attract them to the vicinity of the orchard. Ten nesting-boxes were put up for the wrens and bluebirds; but as the bluebirds were very rare this season, none came to the orchard. Two families of wrens, however, were reared in the boxes in place of one family last year. Nesting materials — strings, hair and straw — were hung in the trees and scattered about. Several marauding cats were killed, and an attempt was made to keep nest-hunting boys away from the neighborhood as much as possible. Thirty-six nests of birds were discovered in the neighborhood, as follows: —

Three red-eyed vireos, ten robins, four Baltimore orioles, three cuckoos, five chipping sparrows, three least flycatchers, two redstarts, two yellow warblers, two chickadees, two house wrens.

Of these all but three were destroyed, probably by boys, the nests being torn down and the eggs missing. The three which escaped destruction were two wrens' nests which had been built in boxes upon buildings, and a robin's nest in a maple-tree within ten feet of a chamber window. This wholesale destruction of nests discouraged several pairs of birds, and they disappeared from the neighborhood. Those remaining built new nests, and after a second or third attempt a few succeeded in rearing young. One nest of orioles escaped the general destruction, and the birds were busy for a long time carrying canker-worms to their young. One of them was noticed to take eleven canker-worms in its beak at one time, and fly with them to the nest. The vireos, warblers, chickadees, cuckoos, orioles and chipping sparrows were particularly active in catching canker-worms, and the English sparrow killed them in considerable numbers.

If the thirty-six pairs of birds whose nests were found had succeeded in raising their young, it is probable that they would have disposed of most of the canker-worms in the neighborhood. Five thousand of these larvæ are sufficient to strip a large apple-tree. One hundred and eight young would have been reared, had each pair of birds raised three. According to Professor Aughey's experience, sixty insects per day as food for each bird, both young and old, would be a very low estimate.\* Suppose each of these one hundred and eight birds had received its sixty insects per day, there would have been 6,480 caterpillars destroyed daily. The destruction of this number of caterpillars would be enough to save the

\* 1st Rep. U. S. Ent. Com. 1877, p. 342.



foliage and fruitage of one apple-tree. In thirty days the foliage of thirty apple-trees could have been saved, or 194,400 canker-worms destroyed. This does not include what the old birds themselves would have eaten.

In these observations the influence of insect parasites and predaceous insects has not been entirely ignored. Hymenopterous parasites were not seen to be numerous, and as it was a year when canker-worms were on the increase, it is not probable that these parasites would have been a prime force in reducing the numbers of the canker-worms had the birds not been present. Even had they been numerous they would have had little effect in checking the ravages of the canker-worm during the present year, as their interest is identical with that of the canker-worm, and they remain in its body until it has finished feeding, allowing it to defoliate the trees before completing their deadly work upon it.

We do not know to what extent such parasites are devoured by birds. This we could not ascertain without shooting the birds, which would have defeated our main object. No parasites of the tent caterpillar or canker-worm were found in the stomachs of the few birds which were examined. It is hardly safe to draw conclusions from observations so limited in their scope, but we may infer from what was observed that the egg-eating birds are of the greatest value to the farmer, as they feed almost entirely on injurious insects and their eggs, and are present all winter when other birds are absent. The summer birds which attack the larvæ are valuable also if they can be so protected and fostered as to become sufficiently numerous to do the work required. It is evident also that a diversity of plants which encourages diversified insect life, and assures an abundance of fruits and seeds, as an attraction to birds will insure their presence. In this connection I wish particularly to note the fact that the mulberry-trees, which ripen their berries in June, proved to be a protection to the cultivated cherries, as the fruit-eating birds seemed to prefer them to the cherries, perhaps because they ripen somewhat earlier.

I believe it would be wise for the farmer to plant rows of these trees near his orchard, and it is possible that the early June berry or shad berry (*Amelanchier canadensis*) might also be useful in this respect. It is a handsome shrub or tree, flowering early in the season, and would be attractive at a time when other trees and shrubs are not in bloom.

At the present time, July 23, 1895, the trees in the orchard appear to be in good condition. They have not suffered from the slight pruning of their foliage which was effected by the few caterpillars and canker-worms which survived. The fruit is well set,

and it now remains to be seen whether the birds will have any considerable effect in preventing the ravages of the codling moth. No other orchard in the neighborhood will produce any fruit this season, with one exception. The nearest orchard, situated directly opposite on the estate across the way, has not been ravaged by the canker-worms. This exemption is due principally to the efforts of the owner, who has banded his trees with tarred paper and has used tree ink faithfully and well upon the paper. He has also taken pains to clear the nests of the tent caterpillar from the trees. This orchard, being nearest to the one visited by the chickadees, was also an object of their attention, and this may account somewhat for the reduction of the pests in this place.

The record of these observations, incomplete as it is, is given for what it is worth as a contribution to the literature on this most interesting and important subject.

MASSACHUSETTS  
CROP REPORT

FOR THE

MONTH OF AUGUST, 1895.

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ISSUED BY

WM. R. SESSIONS,  
SECRETARY STATE BOARD OF AGRICULTURE.

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# CROP REPORT FOR THE MONTH OF AUGUST, 1895.

OFFICE STATE BOARD OF AGRICULTURE,  
BOSTON, MASS., Sept. 2, 1895.

Bulletin No. 4, Crop Report for the month of August, is herewith presented. Particular attention is called to the article on "The San José Scale," by the entomologist of the Board, at the end of this bulletin.

## PROGRESS OF THE SEASON.

Report No. 129 (August, 1895) of the Statistician of the United States Department of Agriculture shows an improvement in the condition of corn of about three points during the month of July, or from 99.3 to 102.5.

The condition of spring wheat has fallen since the last report 6.3 points, being 95.9, against 102.2 for the month of July. Crop excellent, with every indication of a very large yield in Iowa, Minnesota, North Dakota and Colorado. Dry weather, insects, smut, hail and lodging storms have done damage in some States.

Oats are a better crop than last year by 7.7 points, the condition August 1 being 84.5. Drought and grasshoppers, smut or rust, and heavy or continuous rains with severe winds, have lowered the general average of condition. The crop in the eastern States is excellent.

Barley has fallen off 4.7 points in condition since July 1. Damage from drought and cinch bugs in Wisconsin and Iowa, and heavy rains, winds and lodging in Minnesota. A deficient crop in California.

Spring rye has materially improved, and the condition August 1 is 84. This is the condition in Wisconsin, which produces half of the crop of the whole country.

Acreage of buckwheat 96.5 per cent of last year's acreage. Condition is 85.2, which excels last year's condition by 2.9 points.

The condition of Irish potatoes has deteriorated from 91.5 to 89.7 since July 1. The product is so abundant in Minnesota that a price as low as 18 cents a bushel is reported for new potatoes.

Sweet potatoes have deteriorated in condition in the Gulf States since the July report. Along the Atlantic coast the condition improved in New Jersey, Virginia and Florida and declined in the other States. The crop is a promising one in Kansas and Missouri.

The returns of August indicate that the apple crop has met with no serious obstacles to development during the month of July. Taking the whole country, the prospective product is larger than for several years. The general average of condition is 71.2, against 44 last year. In Massachusetts the prospect is for a crop slightly above one-half the normal.

The average condition of peaches August 1 is 83.3, against 22.3 in 1894. The prospective yield has declined heavily in Delaware, where about one-third the normal crop is now indicated. New Jersey has also suffered, the percentage falling 12 points, and resting now at 61. Conditions are high in Connecticut and Georgia, respectively 92 and 104. Much complaint of dropping and rotting is made, the latter especially in the South.

Cotton now stands at 77.9, or  $2\frac{1}{2}$  points lower than the average for August, 1893, and the lowest average for August ever reported.

The condition of tobacco is 82.7, having fallen from 85.9 since July 1. The highest conditions are those reported for Massachusetts and Maryland, 110 and 100 respectively; the lowest are 50 for Wisconsin and 61 for Connecticut.

The general average condition of rice has fallen 0.3 per cent only since July 1, now standing at 84.1.

The average condition of timothy is 69.9, as compared with 75.6 a year ago. Drought has been the principal cause of the deficiency in the crop, but in several States, especially west of the Mississippi River, the quality has been impaired by excess of rain before and during the haying season. There has also been complaint of damage from spring frosts in several States, and in portions of New York and some

other States the grass-hopper has been troublesome. The figures as to clover indicate just two-thirds of a full crop. The crop suffered in many places from the effect of drought last year or freezing weather during the winter, and in a number of important States from drought during a portion of the present season.

The average condition of pastures is 77.8, a slight reduction from the condition July 1. Drought, frost and grass-hoppers are the causes given for the low condition in many of the States.

## TEMPERATURE AND RAINFALL FOR THE WHOLE COUNTRY.

FROM UNITED STATES WEATHER-CROP BULLETINS.

*Week ending July 29.* — Week cooler than usual over much the greater portion of the country, the exceptions being limited areas. There were no marked departures from the normal temperature. More than the usual amount of rain fell in nearly all sections east of the Mississippi valley. The rainfall was also unusually heavy in portions of Colorado, Kansas and New Mexico. Over greater portion of the east Gulf States and Lake region rainfall less than usual. Drought continues in western Ohio and is affecting crops unfavorably in portions of Pennsylvania, South Carolina, Georgia, southern Texas, Kansas and Nebraska. General outlook for corn excellent. Condition of cotton less favorable than last week. Tobacco generally doing well.

*Week ending August 5.* — Temperature conditions of the week nearly normal in the Gulf States except in southern Texas, where it was somewhat warmer than usual. Week also warmer than usual from the upper Missouri valley westward to the north Pacific coast, and thence southward to central California. In all other districts the week averaged cooler than usual. More than the usual amount of rain fell along the south Atlantic and east Gulf coast and from the central Mississippi valley westward over Missouri, Arkansas, Kansas and eastern Colorado. In other sections less than the usual amount of rain fell. Outlook for corn excellent. Condition of cotton has improved. Spring-wheat harvest has begun in North Dakota, and continues elsewhere in the spring-wheat region. Tobacco generally doing well.

Drought continues in Ohio, Pennsylvania, southern Texas and portions of Maryland and the Carolinas. Light local frosts occurred in northern Indiana on July 30 and in western Maryland and the mountains of West Virginia on August 1.

*Week ending August 12.* — Week generally cooler than usual west of the Mississippi River and in southern Florida. Over eastern section of the country week warmer than usual. More than the usual amount of rain fell during the week in the Lake region, southern New England and over the northern portion of the middle Atlantic States, and in limited areas elsewhere. Corn still continues very promising, though injured by drought in some sections. Cotton has improved. Tobacco generally in good condition. Frosts occurred in the central and northern Rocky Mountain regions on the 8th, 9th and 10th.

*Week ending August 19.* — Week cooler than usual in the extreme north-west. Along the central and eastern Gulf coasts the temperature conditions were nearly normal, but in all other districts east of the Mississippi and over the central and southern portions of the country to the westward the week averaged warmer than usual. Heavy rains fell during the week along the New England coast and in the South Atlantic and east Gulf States. Throughout the middle Atlantic States and Ohio valley and over nearly the whole Lake region, upper Mississippi and upper Missouri valleys the weekly rainfall was decidedly below the average, and over a large part of those districts little or no rain has fallen, and no rain fell in the plateau and Pacific coast regions during the week. In the principal corn States the early planted corn has matured rapidly, and some has been cut in Missouri. Tobacco has suffered much from drought in Maryland, and continues in poor condition in Ohio. Over the eastern portion of the cotton belt too much rain has caused rust and shedding. Spring-wheat harvest is nearly completed. Frost occurred in Minnesota, Montana and North Dakota on the 14th. While the week has not been favorable for fall ploughing, considerable has been done, and some seeding.

*Week ending August 26.* — The average daily temperature differed but slightly from the normal in New England,



the middle Atlantic and west Gulf States, and in the Ohio and lower Missouri valleys. Slightly cooler than usual in northern plateau and north Pacific coast region, and along the immediate coast of California. Slightly warmer than usual from Lake Michigan westward over the upper Mississippi and upper Missouri valleys. In the upper Mississippi and lower Missouri valleys and over the greater part of the upper Lake region the rainfall during the week was very heavy. Also more than the usual amount in certain limited areas, but generally the rainfall of the week was less than usual. Frosts occurred in Montana, North Dakota and Minnesota on the 20th, in Michigan on the 21st, and in portions of Ohio, Pennsylvania, New York and New England on the 22d; but slight damage was done.

#### SPECIAL TELEGRAPHIC REPORTS.

*Week ending July 29.* — New England. Weather favorable for crop growth and for harvesting; most of upland grass cut, crop generally lighter than usual, but large second crop in prospect; grain very heavy and ripening fast; cranberries promise fair crop.

*Week ending August 5.* — New England. Frequent showers and fine growing weather, except too cool nights; wind and heavy rain on 30th broke down some corn, grain and tobacco; continued damage by grasshoppers in northern New Hampshire; all crops making good growth.

*Week ending August 12.* — New England. Favorable weather for growth of crops and harvesting; some damage from heavy local storms; potatoes badly blighted in south, and some indications of decay; corn heavy; tobacco good, and cutting begun.

*Week ending August 19.* — New England. Warm, with much sunshine and sufficient rainfall, and crops have advanced and ripened rapidly; much grain harvested in excellent condition; potato blight and decay increasing in southern and appearing in northern districts.

*Week ending August 26.* — New England. Weather slightly too cool and dry most of the week for the best advancement of crops; light general frost in low lands on 22d, but only slight damage; tobacco cutting well under way.

## WEATHER IN MASSACHUSETTS DURING AUGUST, 1895.

There has been some complaint of dry weather in western counties, checking crop growth and causing short feed in pastures, but generally the weather throughout Massachusetts during August has been very favorable for vegetation and for farm work. Unusually low minimum temperatures have been recorded, and the maximum has not been so high as is usually experienced in August, but the mean temperature for the month as a whole has been slightly above the normal. At Fitchburg this excess amounted to only  $0.2^{\circ}$  a day, but at Springfield it was  $1.7^{\circ}$  and at Boston  $1^{\circ}$  a day warmer than usual. At the Weather Bureau Office in Boston the temperature was below the normal on the 1st to 3d, 12th, 13th, 20th to 22d and on the 30th, and was above on all the other days. The warmest spells were from the 4th to 11th and from the 23d to 28th. The lowest temperature was on the 22d, when light frosts were general in low lands all over the State. No damage has been reported from it except on the Cape, where slight injury was done to cranberries. The temperature went below  $40^{\circ}$  at most places, while at Concord a terrestrial radiation thermometer in the grass registered  $32^{\circ}$ .

There has been plenty of sunshine, few severe thunderstorms or heavy damaging rains, and a rainfall slightly below the usual amount for August at most places. At Boston the deficiency amounts to about one and one-fourth inches, but at Springfield to only three-fourths inch. At the former station only three thunderstorms were noted, while the mean cloudiness was 4.7 on a scale of ten, and there were only three cloudy days. Crops have ripened well, and the conditions have been very favorable for harvesting and for summer ploughing and seeding. Pastures have generally kept in good condition and the second crop of grass has started well. Late forage crops have had excellent conditions for growth.

In the circular to correspondents returnable to us August 26 the following questions were asked : —

1. What insects are doing the most damage in your locality?

2. What is the prospect for rowen?

3. What is the prospect for winter apples?

4. What is the prospect for potatoes?

5. What is the prospect for the corn crop?

6. What is the prospect for fodder crops for green feeding.

7. What is the condition of pasturage in your vicinity?

8. How has the oat crop compared with last year's crop?

Returns have been received from 109 correspondents, and from them the following summary has been made up : —

#### INSECTS.

The majority of the correspondents speak of the ravages of insects as mostly over for the season. Grasshoppers are reported as doing considerable damage to pastures and mowings, particularly in the western counties. Potato bugs are doing damage where the tops are still green, and are also reported as attacking tomato plants. In Barnstable County the cranberry fruit worm is generally spoken of as doing damage. Other insects mentioned are the horn fly, the cabbage worm, the squash bug, the white grub, the asparagus beetle, the elm tree leaf beetle, the fall tent caterpillar, the codlin moth and the corn worm.

#### ROWEN.

For the State as a whole rowen will probably be a fair average crop; in the four western counties it will, however, fall considerably short of an average crop. Elsewhere in the State it is generally spoken of as a good crop, though some localities report poor or at the best only fair crops.

#### WINTER APPLES.

Winter apples are generally reported to be a very poor crop, not a single correspondent speaking of them as good and only three as average. Frost at time of blooming,

drought later in the season, and, in some sections, hail, have combined to bring about this result. The quality is also spoken of as poor. Baldwins are reported in many localities as being even poorer than other varieties. Pears, when mentioned, reported to be a good crop, as are also grapes.

#### POTATOES.

Potatoes promise to be considerably above the average yield in nearly all localities. The tubers are of large size and generally free from scab. Rot has appeared in many sections and in some the crop is reported as rotting badly. This has operated to materially reduce the yield of marketable potatoes in those sections. It is as yet impossible to say what the final effect will be on the crop as a whole. Prices, where reported, are spoken of as low.

#### INDIAN CORN.

The prospect is that Indian corn will be one of the largest crops ever grown. It is almost universally reported to be in good condition, with large stover and well set with ears. About two weeks of good weather are needed to perfect the crop, which will then be out of danger from frost in most localities. Three correspondents report slight injury from frost on the morning of August 22, but the damage was only slight in all cases. Sweet corn is also reported to be an excellent crop.

#### FODDER CROPS.

All kinds of soiling crops have done unusually well this season and are reported as being in excellent condition. Fodder corn, late-sown barley and Hungarian grass seem to be the principal crops relied on at this time, and all three have done well.

#### PASTURAGE.

Pasturage has hardly recovered from the dry weather of the early part of the season. This is particularly noticeable in the western counties, where drought and grasshoppers have combined to make the condition of the pastures considerably below normal. Elsewhere the condition approximates more nearly to the average, but cannot be said to be

above average in any extended locality. Some report pastures as being short, but still green.

#### OATS.

Oats are largely cut green for fodder or hayed in this State, but where grown for grain they were much better than last year's crop, and up to or above an average crop. The same may be said of those cut for other purposes. Very little rust was reported.

#### TOBACCO.

No question was asked in regard to tobacco, but enough information has been obtained, from the returns of correspondents and from other sources, to warrant the statement that the crop is, at present, in the best condition of any crop for years. It is a large growth, with a large leaf of fine color, and remarkably free from imperfections. The crop is now practically all secured in excellent condition. Some sales are reported at prices advanced over those of the last few years.

## NOTES OF CORRESPONDENTS.

(Returned to us August 26.]

## BERKSHIRE COUNTY.

*Sheffield* (DWIGHT ANDREWS). — Potato bugs are doing some damage. It has been too dry for the rowen crop. Winter apples do not promise to be up to the average. Potatoes are a good crop, though there is some complaint of blight and rot. Corn is better than an average crop. Fodder crops are all looking well. It has been too dry for pasturage. Oats are a better crop than last year.

*Becket* (WM. H. SNOW). — Grasshoppers are doing some damage. Rowen does not promise to be a very good crop and will be late. There will be very few winter apples, particularly Baldwins. Potatoes promise to be a large crop. Corn is looking well. Fodder crops all look well. Pasturage is getting short and dry. Oats are more than an average crop.

*Lee* (A. BRADLEY). — There will be very little rowen. Winter apples promise a fair crop, about 70 per cent of a full crop. Potatoes are a full crop. Corn is better than usual; 110, as compared with an average crop. All fodder crops are doing well. Pasturage is in good condition. Oats are much better than last year. All crops are much above several years past, but our pastures have not yet fully recovered from the drought of the last two years.

*Richmond* (T. B. SALMON). — Rowen promises to be a good crop. Winter apples will be a very fair crop. The prospect for potatoes is good. Corn shows a large stalk, but the ears are small and not very well filled out. Fodder crops for green feeding are doing well. Pastures are very short and dry. Oats are above an average crop; grain better filled and acreage larger than usual.

*Hinsdale* (S. M. RAYMOND). — Potato bugs are doing some damage. There is scarcely any rowen and the crop will be very poor. Winter apples are a very poor crop and what there are are very small. Prospect for potatoes very good; not a large yield, but quality good. Corn promises to be a very good crop. Fodder crops are doing very well. Pasturage is in poor condition. Oats were a much better crop than last year.

*Cheshire* (L. J. NORTHUP). — Grasshoppers are doing some damage. Do not think there will be a ton of rowen cut in town. Winter apples will probably be 60 per cent below a full crop. Potatoes will be much above the average unless they rot. Corn is looking well, but most fields need two weeks of good weather to fully mature them. Fodder corn looks well and helps out the pastures amazingly. Pastures are almost as brown as the road. Oats 15 per cent ahead of last year's crop. It is very dry, many springs being dry that never failed before, but crops on the whole look much better than would be expected.

#### FRANKLIN COUNTY.

*Monroe* (D. H. SHERMAN). — Grasshoppers are doing some damage. Rowen will be light, as it has been too dry. Winter apples will be less than half a crop, though rather better than early ones. Potatoes a fair crop; no rot, quality good, prices low. Corn looks well, but is late. Pasturage is dry and short. Oats are all hayed in this section.

*Bernardston* (R. H. CUSHMAN). — Grasshoppers are very plenty. Rowen will be an average crop, some mowings above the usual quantity. Very few winter apples; all apples falling badly; ripening fast. Potatoes a fine crop of large tubers. Corn seldom, if ever, any better than this year; acreage large. More rain is needed for fodder crops and pastures. Pastures are short from early drought and grasshoppers. Oats a full average crop.

*Deerfield* (CHAS. JONES). — Rowen will be a fair crop where the first crop was taken off early, where taken off late will be very light. Winter apples not one-fourth of a crop. Potatoes healthy and above the average. Corn is above the average. Fodder crops are good and pastures are looking fairly well. Rye and oats are very good crops. Tobacco is three-fourths in the sheds and is a very fine crop.

*Sunderland* (J. M. J. LEGATE). — The prospect for rowen is poor. Winter apples will be below an average crop. About an average crop of potatoes; tubers large, but few in a hill. Corn will be a heavy crop, the best in years. Sweet corn mostly raised for green feeding and is looking well. Pasturage is getting short. Oats are looking well. Onions will be a full crop and perhaps above the average. Tobacco is looking finely and is a heavy, fine growth, with no damage as yet from wind, hail, green worms or frost.

*Leverett* (W. L. BOUTWELL). — Rowen will be a very slim crop. Winter apples are about average. Potatoes promise a large crop of very fine tubers. Corn promises to be an extra crop. Fodder

crops are in good condition. Pastures are badly dried up. Oats about as last year.

*Northfield* (T. R. CALLENDER). — Considerable rowen will be cut on newly seeded land. The yield of winter apples will be below the average. Early potatoes are yielding well, though not as heavily as expected; considerable scab and blight. Corn never looked better or more heavily eared, but warmer weather is needed to perfect it. All fodder crops look unusually well. Pastures have not recovered from last year's drought. Oats a much better crop than last year. A light frost occurred August 22, but did no especial damage. Cucumbers, grown here for pickling, have been injured by rain and cool weather so that the crop is reduced about 50 per cent.

#### HAMPSHIRE COUNTY.

*Pelham* (J. L. BREWER). — The codlin moth is doing some damage. Where the first crop was cut early rowen looks finely, but on other fields it does not grow very much. Winter apples will be a very light crop. Potatoes are the best crop for years. Corn promises to be a very good crop if not injured by frost. Fodder crops all look well. Pastures are becoming very dry. Oats were an excellent crop. On the morning of August 22 there was a light frost, but little damage was reported.

*Amherst* (WM. P. BROOKS). — Horn flies cause cattle much annoyance. Prospect for rowen good; on the Agricultural College farm some fields will be cut three times. Prospect for winter apples fair, limited localities excellent. Potatoes good on the whole; size large, but fewer in the hill than usual. Corn an excellent crop, but smut rather abundant. All fodder crops have done well, but will perhaps be less needed than usual. Pasturage in good condition. Oats have been better than usual, being less rusted.

*Hadley* (L. W. WEST). — The prospect for rowen is poor. Winter apples will be a light crop, as it is not a bearing year. Potatoes in many places are few in a hill and there are many small ones; blight is universal. Corn is a remarkably good crop everywhere. Fodder crops are good. Pastures are poor because of dry weather. Oats are a better crop than last year.

*Northampton* (D. A. HORTON). — Rowen will be an average crop. Winter apples not a good crop and below that of 1894. Potatoes were never better. Corn promises to be a good deal more than an average yield. Fodder crops are good. Pasturage is in very fair condition. Oats a better crop than last year; no rust.

*Westhampton* (A. D. MONTAGUE, JR.). — Grasshoppers and squash bugs are doing some damage. The prospect for the rowen



crop is good. There are very few winter apples and the quality is poor. Early potatoes good; late ones affected by blight. The prospect for fodder crops is good. Pasturage is in good condition. Oat crop about as last year, mostly raised for fodder.

*Goshen* (ALVAN BARRUS). — The black squash bug and the potato bug are doing some damage. The prospect is not encouraging for a large crop of rowen. Winter apples promise to be a very short crop. Potatoes will be a good crop unless they rot. Corn a fair crop except where cut by frost. Fodder crops good except on low lands. Pastures are too dry for perfection. Oats nearly all cut for green or dry feed. Quite a sharp frost on low lands on the morning of August 21, but it did not reach the hills.

#### HAMPDEN COUNTY.

*Tolland* (E. M. MOORE). — Rowen promises to be a medium crop. Winter apples not more than half a crop. Potatoes are quite a good crop, but some fields are rotting badly. Corn promises to be a good crop, the heaviest for several years. Fodder crops promise to be very good. Feed in pastures is very short, there not having been rain enough to make it grow. Oats a much better crop than last year.

*Blandford* (E. W. BOISE). — The horn fly is very troublesome this season. Judging from present appearances, little rowen will be cut. Winter apples will be three-fourths the average crop for an off year. Potatoes have looked well, but nearly all fields now show blight and complaint is made of decay. Corn promises to be an extra good crop. All fodder crops are extra good. Bad droughts last season and this make our pastures very short. Oats one-fourth better than last year and no rust. There will be no shortage in hay, on account of the small amount of stock now on hand.

*West Springfield* (N. T. SMITH). — Rowen will be a poor crop except on moist land. Very few good winter apples; cider apples are in fair quantity. Potatoes few in a hill, but tubers fair and of good size; blight universal and some rot. Corn never looked better. Fodder crops are in good condition, though it is getting dry for the late ones. Pasturage is again in need of rain. The oat crop is one-third better than last year.

*Wilbraham* (H. M. BLISS). — Rowen 60 per cent of a full crop. Winter apples not more than half a crop. Potatoes a full crop. Corn about 90 per cent of a full crop. Fodder crops are all in good condition. Pasturage is in fair condition. Oats a better crop than last year.

*Hampden* (JOHN N. ISHAM). — The horn fly is very plenty.

Rowen will be a medium crop, but much better than last year. Winter apples uneven and on the whole a small crop. Potatoes are a large crop, but have ripened too early to reach their full growth. Corn a large growth and well set with ears. Fodder crops are very thrifty, with abundant foliage. Pasturage is good for this time of year. Oats heavier than last year; straw very long and lodged badly.

*Monson* (A. H. WHITE). — A little rowen will be cut. Winter apples will be a very light crop. Potatoes are a large crop, but are beginning to rot some. Corn promises to be a good crop. The prospect for all fodder crops is good. Pasturage is in rather poor condition. Oats are a better crop than last year.

#### WORCESTER COUNTY.

*Southbridge* (G. L. CLEMENCE). — The rowen crop is the best for four years. Apples are scarce and very poor in quality. Potatoes are a very large crop, but are rotting badly in some places. Corn a large growth and well set with ears. Prospect for fodder crops good. Pastures are holding out much better than usual. Oats show a heavy growth of straw, mostly cut for hay.

*New Braintree* (C. D. SAGE). — Grasshoppers are doing some damage. Very little rowen will be cut, as it has been too dry. Winter apples not more than 25 per cent of a full crop. The yield of potatoes will be large if they do not rot; very little complaint as yet. Corn is good, though some of it is a little late. Fodder corn has done well. Pasturage is rather short and needing more rain. Oats were excellent, the best for years.

*Oakham* (JESSE ALLEN). — The prospect for rowen is good. There are very few winter apples. Potatoes are rotting some, but will be a large crop. Corn is generally excellent, but was injured August 21, on low lands, by frost. Fodder crops for green feeding are good. Pasturage is in good condition. Oats are a much better crop than last year.

*Petersham* (S. B. COOK). — Rowen very good; the frequent rains have kept it growing nicely. There will be only a very small crop of winter apples. Potatoes good, more than an average yield; rot has not yet appeared. Corn very good; a heavy growth of stalks and ears set well. A large amount of fodder crops planted and growth heavy. Pasturage good, better than usual at this season. Oats much better than last year. There is a fair supply of fall apples; pears and grapes plenty.

*Fitchburg* (Dr. JABEZ FISHER). — Rowen promises to be a good crop. Winter apples will be a very poor crop. Vines of the early potatoes are blasting and the tubers rotting, with a prospect of the

same on the late varieties. More rain is wanted for fodder crops. Pasturage is in fair condition.

*Berlin* (P. B. SOUTHWICK). — Potato beetles are doing some damage. Prospect for the rowen crop not as good as a few weeks ago; more rain needed. No winter apples in this vicinity. Potatoes are rotting badly and the prospect is not at all good. Corn promises to be a very fair crop. Fodder crops are now looking well. Pasturage is not in very good condition. Oats a full average crop.

*Holden* (G. S. GRAHAM). — Rowen very good where fields are in good condition. The prospect for winter apples is very poor indeed. Potatoes are a very good crop, with some rot. Corn is very fine and with two weeks more of good weather will be all right. Fodder crops are generally good. Pasturage is in very good condition for this time of year. Oats a good crop.

*Worcester* (S. A. BURGESS). — Rowen looks well. The prospect is that winter apples will be a very light crop. Potatoes are a very good yield, but are rotting somewhat. Corn is a good crop and is earing out heavily. All kinds of fodder crops look well. Pasturage looks green and nice and feed is good. Quality of oats not as good as last year, but quantity better.

*Oxford* (D. M. HOWE). — Rowen promises to be a fair crop. Winter apples are not plenty in this section. Potatoes are a good crop, but some fields have rotted badly. The prospect for corn is good, though the nights are rather cold for it. Pasturage is in good condition. Oats are heavy everywhere.

*Blackstone* (L. R. DANIELS). — Potato beetles and the borers are doing some damage. Rowen promises to be a good crop, better than last year. There are very few Baldwin apples; other varieties make a better showing. Potatoes are a plentiful crop, but about 20 per cent have rotted. The prospect for the corn crop is of the very best. Fodder crops in very good condition, oats much better than last year. Pasturage is in fair condition, but is eaten to the turf.

#### MIDDLESEX COUNTY.

*Framingham* (H. S. WHITEMORE). — Rowen about half of an average crop. Winter apples very few indeed and poor in quality. Potatoes a good yield, but rotting badly; some fields not worth digging. The outlook for a large yield of corn is promising at the present time. Fodder crops are looking well; corn and barley heavy crops. Pasturage poor and feed short; stock has to be fed at the barns. Oats about as last season; mostly cut for hay.

*Concord* (WM. H. HUNT). — Asparagus beetles and potato

beetles are doing some damage. The prospect for rowen is very good. There are very few winter apples; some fall apples. Potatoes are a good crop, but are rotting badly. Corn promises to be a very good crop. All fodder crops are doing well. Pasturage is rather better than the average at this time of year. Oats only grown for fodder and have done well. The frequent showers have kept all crops growing.

*Chelmsford* (P. P. PERHAM). — Horn flies are annoying cattle somewhat. Rowen is below an average crop. There will be very few winter apples. Potatoes are a large yield, but are rotting badly. Corn promises a full crop. Fodder crops are all good; fodder corn, oats and barley are the principal crops grown. Pasturage is in good condition. Oat crop much better than last year.

*Billerica* (J. N. PARDEE). — Rowen promises to be a good crop. No winter apples to speak of. Yield of potatoes heavy and quality excellent; few complaints of rot. Corn will be an immense crop. All fodder crops are luxuriant. Pasturage is in very good condition. Oats much ahead of last year's crop. Since June the season has been very favorable for the growth of all crops, but farmers depending upon marketing truck are suffering severely from the state of the markets, prices being unusually low, and many of them, with an abundance of produce, cannot pay their bills.

*Wilmington* (E. N. EAMES). — There will be a heavy crop of rowen. Winter apples are very few. Potatoes promise to be a large crop. The prospect for the corn crop is good. Fodder crops for green feeding are looking well. Pasturage is at present in fair condition.

*Woburn* (W. H. BARTLETT). — Cabbage worms and squash borers are doing some damage. Rowen is a very good crop, far better than usual. There are very few winter apples indeed in this vicinity and they are dropping somewhat. Potatoes will be a good crop; some rot. Sweet corn is yielding well. All kinds of forage crops are looking well. Pasturage is in first-rate condition. All farm and garden crops are looking well, but prices do not leave much margin for profit. Tomatoes do not ripen well, owing to cool nights and heavy rains.

*Newton* (OTIS PETTEE). — Rowen promises to be a very good crop. There will be very few winter apples. The prospect for the corn crop is good. Fodder crops are all looking very fair. Pasturage is generally in good condition.

#### ESSEX COUNTY.

*Haverhill* (EBEN WEBSTER). — Rowen promises to be a fair crop. Winter apples will be a very light crop. Potatoes are a

good yield, but are rotting. The prospect is favorable for a good crop of corn. Fodder crops are all looking well. Pasturage is in fair condition.

*Groveland* (ABEL STICKNEY). — Rowen will not be as good as was expected. Prospect for winter apples very poor in most localities. Potatoes promise a good yield. If frost does not come too early the corn crop will be good. Fodder crops are all looking well now. Pasturage is in better condition than usual at this season of the year. Oats are mainly cut for feed.

*West Newbury* (J. C. TARLETON). — Horn flies are the most troublesome insects. Rowen is a very good crop in this locality. Winter apples will be quite a poor crop. Some fields of potatoes are rotting badly, while others are very good crops. The corn crop is the greatest for years. The prospect is very good for all fodder crops. Pasturage was never better at this time of year. Oats are a heavy crop; few are threshed, being mostly cut for fodder.

*Ipswich* (O. C. SMITH). — Rowen is very good, the best for a number of years. Winter apples will not be more than 30 per cent of an average crop. Potatoes have grown well and are of large size, but many complain of blight or rot. Corn an excellent crop, never better. All fodder crops will be good. Pasturage in very good condition, as there has been sufficient rain to keep the grass growing. Oats fully 10 per cent better than last year. Pears a full crop of very good quality; grapes promise abundantly.

*Marblehead* (WM. S. PHILLIPS, Jr.). — Rowen promises to be a very fair crop. Winter apples will be a small crop. At present the prospect for potatoes is not very good. Corn is about an average crop. Fodder crops for green feeding are looking well. Pasturage is a little above the average in condition for this time of year. Potatoes have blighted badly, and in some cases farmers have stopped digging.

#### NORFOLK COUNTY.

*Franklin* (C. M. ALLEN). — Rowen will be an average crop. Winter apples will be a very light crop. Potatoes will be better than an average crop, unless attacked by rot. Corn is the best crop for several years. Fodder crops are excellent. There is not now much feed in pastures. Oats are a heavier crop than last year. Since the rains of the last of June all growing crops have done finely.

*Medway* (M. MORSE). — White grubs are doing some damage. Rowen promises to be very poor indeed. Winter apples are not more than one-fifth of a full crop. Some fields of potatoes are light, but the average crop is large; there was some blight, but we

cannot yet say as to rot. The prospect for corn is very good. Fodder crops for green feeding are good. Pasturage is as good as in average seasons. Oats are grown for green feed or for hay.

#### BRISTOL COUNTY.

*Attleborough* (ISAAC ALGER). — The prospect for rowen is good. No winter apples. Potatoes are a fair crop. Corn is above an average crop. Fodder crops for green feeding are in average condition. Pasturage is above the average. Oats were a better crop than last year. July and August have been unusually good growing months.

*Raynham* (N. W. SHAW). — Grub worms and potato bugs are doing some damage. The prospect for rowen is very good indeed. Winter apples were never poorer. Potatoes will be a very good crop. The prospect is for a good crop of corn. There is more rowen than usual and it is looking well. Pasturage is much better than usual at this time of year. Few oats sown and those not very good.

*Dighton* (J. N. PAUL). — The prospect for the rowen crop is good. Winter apples will be a very poor crop. Potatoes promise to be a full crop. The prospect is that the corn crop will be good. Fodder crops for green feeding are looking well. Pasturage is in good condition.

*Berkley* (R. H. BABBITT). — The white grub of strawberry worm is doing some damage. Rowen promises to be a fair crop. The prospect is that winter apples will be a very light crop. Potatoes promise to be about an average crop. Corn will be much below last year's crop. A larger acreage of the various fodder crops has been sown and they are looking well. Pasturage is getting short in this vicinity. Oats are a lighter crop than last year.

*Dartmouth* (L. T. DAVIS). — Rowen promises to be a fairly good crop. Winter apples will be a very poor crop in this section. Potatoes have made quite a good growth, but are rotting badly on some fields. Corn is looking very well and will soon be past harm from frost. Fodder crops are in good condition. Pasturage still holds out quite good. Oats are a somewhat better crop than last year, though lodged in some places.

#### PLYMOUTH COUNTY.

*Hingham* (AARON LOW). — Rowen very good and growing finely. Winter apples a very small crop. Potatoes will be a large crop, although in some sections they are rotting somewhat. Corn is looking very well; much fed out green. Green fodder crops

growing finely. Pasturage is in good condition. Market-garden crops are good, but prices are extremely low. Tomatoes, squashes and melons are looking finely, but are late in ripening. All fruit except grapes is very scarce and of poor quality; grapes large and fine.

*Marshfield* (J. H. BOURNE).—White grubs are eating potatoes and strawberry plants. The prospect is that rowen will be a poor crop. Winter apples will be an exceedingly poor crop. Potatoes will be a good crop, but not more than three-fourths as many as if rain had fallen a month ago. Corn is an excellent crop; if the frost keeps off for three weeks it will be the best crop for ten years. Fodder crops are all looking well and barley is particularly good. Pasturage is very short. The oat crop is fully as good as last year.

*Hanson* (F. S. THOMAS).—Rowen promises to be a good crop. Winter apples are very, very poor. Potatoes are good in quality and quantity. The prospect for the corn crop is fair. Fodder crops for green feeding promise to be good. Pasturage is in fine condition.

*Kingston* (J. H. CUSHMAN).—Rowen bids fair to be about a two-thirds crop. There are very few winter apples and those are of poor quality. What potatoes have been dug are very good. Corn promises to be a heavy crop. Fodder crops are all very good. Pastures are very short and cows are fed from sown crops. Oats are up to any other year.

*Lakeville* (ELBRIDGE CUSHMAN).—Rowen is a remarkably good crop, especially on low meadows. Winter apples are poor indeed; there will be a few Greenings but practically no Baldwins. Potatoes are an abundant yield, but are rotting some, especially on low ground. Corn was probably never better. All fodder crops are good. Pasturage on high ground is short, as is usual at this time of the year, but that on low ground is fair. Oats are a better crop than last year. Pears and grapes are good crops. Prices generally rule low, but the year promises to be a more than usually prosperous one.

#### BARNSTABLE COUNTY.

*Falmouth* (D. R. WICKS).—Cranberry worms are doing some damage. Rowen promises to be a good crop. Winter apples will be a very small crop. Potatoes are a large crop, but they have blasted badly and are beginning to rot. Corn promises to be a good crop. Fodder crops were never in better condition. Pasturage is in good condition. Oats are a heavy crop, much better than last year.

*Sandwich* (J. R. HOLWAY). — Cranberry worms are quite plenty on some bogs. Rowen promises to be a better crop than usual. There will be an average crop of all winter apples except Baldwins. Potatoes promise to be the best crop for a number of years. If the nights are not too cool, corn will be a good crop. Fodder crops are all looking well. Pasturage is rather short, but is above the average for this time of year.

*Mashpee* (W. F. HAMMOND). — The cranberry fruit worm is doing some damage. Rowen promises to be a very good crop. Winter apples are very scarce in this vicinity. Potatoes are a very good crop, but a few fields are struck with the blight. Corn is a good crop. Fodder crops are doing well. Pasturage is in very good condition. The oat crop is about the same as last year.

*Dennis* (JOSHUA CROWELL). — The fruit worm on cranberries is our most troublesome insect. Rowen promises to be a good crop. Winter apples are very scarce. Potatoes promise to be a full crop. Corn will be more than an average crop. Fodder crops are about average in condition. Pasturage is in fairly good condition. Very few oats are sown and those are cut for hay.

*Brewster* (J. H. CLARK). — The cranberry worm is doing the most damage. The prospect for rowen is very good indeed. Winter apples will be a poor crop. Potatoes promise to be a very good crop. Corn is a very good crop. All fodder crops are doing very well. Pasturage is in excellent condition. The oat crop is about the same as that of last year.

#### DUKES COUNTY.

*West Tisbury* (GEO. HUNT LUCE). — Prospect for the rowen crop good. Prospect for winter apples poor. Potatoes a large crop, but inclined to rot. Corn promises to be a fair crop. Fodder crops for green feeding are in good condition. Pasturage is in very good condition. The oat crop is better than last year.

#### NANTUCKET COUNTY.

*Nantucket* (C. W. GARDNER). — Corn worms, cabbage worms and potato bugs are doing some damage. Rowen promises to be an extra crop. No winter apples. Potatoes have rotted badly, on account of so much bad weather. Corn does not look as well on heavy land as it does on light. Fodder crops are in extra good shape. Pasturage is in better condition than for the last ten years. Oats a very fine crop, but mostly cut for fodder.



# BULLETIN OF MASSACHUSETTS BOARD OF AGRICULTURE.

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## THE SAN JOSÉ SCALE. (*Aspidiotus perniciosus* Com.)

BY C. H. FERNALD, ENTOMOLOGIST TO THE BOARD.

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### HISTORY AND DISTRIBUTION.

The San José (Sän Hō-sā') scale insect first made its appearance in California not far from 1870, but it is not known from what country it came, though it is now known to occur in Chili, Australia and Hawaii. It increased rapidly till 1873, when it had become so abundant on the fruit trees at San José as to seriously injure them, and received the common name of the San José scale.

It was first technically named and described from Santa Clara County, California, by Prof. J. H. Comstock, in the report of the Department of Agriculture for the year 1880, page 304, under the name *Aspidiotus perniciosus*, "The Pernicious Scale." After describing it, Professor Comstock says: "From what I have seen of it, I think that it is the most pernicious scale insect known in this country; certainly I never saw another species so abundant as this one is in certain orchards which I have visited. It is said to infest all the deciduous fruits grown in California, excepting the peach, apricot and the black tartarian cherry. It attacks the bark of the trunk and limbs as well as the leaves and fruit. I have seen many plum and apple trees upon which all the fruit was so badly infested that it was unmarketable." Since Professor Comstock wrote the above, the insect has been found on apricot and peach as well as other plants.

In 1882 it had extended into all the fruit-growing districts of California, and has since that time been distributed over the country more or less widely, and is now known to occur in Oregon, Washington, British Columbia, Idaho, Nevada, Arizona, New Mexico, Missouri, Indiana, Florida, Virginia, Maryland, Pennsylvania, New Jersey, New York and Massachusetts. It does not appear to be very generally distributed as yet in the Eastern

States, but there is great danger that it may soon become so through the distribution of infested nursery stock, if the most active measures are not adopted for its destruction.

The dissemination of this insect in the Eastern States has been traced by the entomologist of the Department of Agriculture in Washington to nursery stock received from Missouri and New Jersey. Prof. J. B. Smith, in "Entomological News," Vol. 6, page 153, and elsewhere, mentions two large nurseries in New Jersey that were badly infested with this scale, and from which infested stock had been sent to various points in the Eastern States. One of these was owned by Messrs. Parry, at Parry, Burlington County, N. J., the other by the J. T. Lovett Company, at Little Silver, Monmouth County, N. J.

Prof. L. O. Howard, entomologist to the Department of Agriculture in Washington, in studying the geographical distribution of this and other insects in connection with the life zones into which this country has been divided, has expressed the opinion that the San José scale is not likely to thrive on fruit trees in New England, for a time at least. Professor Smith seemed to entertain the same opinion, based on his studies of the distribution of the insect in New Jersey. I had therefore felt quite easy about the matter, so far as Massachusetts was concerned, till, on the 29th of March of the present year, my attention was called to some scale insects on several young plum trees on the grounds of the horticultural department of the Massachusetts Agricultural College. These trees, according to the record books, came from the J. T. Lovett Company, Little Silver, N. J., in the spring of 1894. Fearing that we had this dreaded insect to deal with, I sent infested twigs to Professor Howard for determination, and received the reply that they were the San José scale, but that none of the examples sent were alive.

Wishing to determine whether any of these insects had survived the winter, I had two of the trees taken up and set out in the cold part of the insectary greenhouse, and the remaining infested trees were burned. Scales appeared on the growth of the previous year, so that the insects succeeded well at least during the summer of 1894. On June 10 live scales were observed on the trees transplanted to the insectary greenhouse, and on the 14th the young were swarming all over them, and even extended to some small apple trees growing near in the same part of the greenhouse. As this seemed to settle the question of their ability to survive our winters here in Amherst, or at least the winter of 1894-95, which was an average one, I had all these trees very carefully burned, to prevent any further spreading of the pest. So far as

can now be seen, no other trees on the grounds have been infested, but it is a little early to feel absolutely sure on this point.

As soon as it was discovered that the San José scale had been received here on nursery stock from outside of the State, I feared that other nurseries might have become infested in a similar manner, and therefore I sent my assistant, Mr. Lounsbury, to different nurseries to look for them. He reported that on April 19 he found the San José scale on two plum trees, two pear trees and a rose bush in Roslindale, Mass. The plum trees were badly infested with living scales, while the pear trees and rose bush were but slightly so. The scales occurred on all parts of the trees, but were the least numerous on the new growth. The pear trees had been on the grounds for three years and the plum trees two years. Mr. Lounsbury was informed that these trees were obtained from a local agent in West Roxbury, who claimed to have purchased them from the Shady Hill nursery, Bedford, Mass. On April 23 Mr. Lounsbury visited the Shady Hill nursery, and found the San José scale alive in large numbers on several different varieties of apple trees. Mr. Kohler, in charge of the nursery, told him that these trees were bought from the Cambridge nurseries, where they had been growing three or four years. The Cambridge nursery was then visited, and pear, peach and apple trees were found infested with the scale, and many of the worst-infested trees were dead. As no stock had been added to this nursery for three years, these trees must have been infested at least that length of time. I have not been able to learn from what source the stock in this Cambridge nursery was obtained.

On July 9 I received a twig of an apple tree from Mr. W. W. Rawson, with the request to inform him what the matter was with it. An examination showed that it was infested with the San José scale. Further correspondence revealed the fact that the twig came from an apple tree in the orchard of Mr. E. E. Cole, in the town of Scituate. Mr. Cole wrote me that the orchard contained ninety trees that were set out three years ago. It is situated in a protected spot with trees on three sides, and is within two miles of the ocean in a direct line. He also wrote me that the trees were received from Mr. Rawson, who informed me that he obtained most of his nursery stock of that description from the Shady Hill Nursery Company.

It is therefore probable that the Shady Hill nurseries received infested stock from some outside nursery, possibly in New Jersey, and have unintentionally become a centre of infection for orchards in the eastern part of this State. To what extent this pest has become distributed through the State it is impossible to say, but

that it is able to live and destroy fruit trees in some, if not in all, parts of the State seems evident from this history, which is given here quite at length because of the expressed opinion of Messrs. Howard and Smith that it would not survive in New England.

#### DESCRIPTION OF THE SCALE AND INSECT.\*

The female scale is shown in Fig. 1, *a*, of the natural size, on a moderately infested pear, and at *b*, greatly enlarged. It is

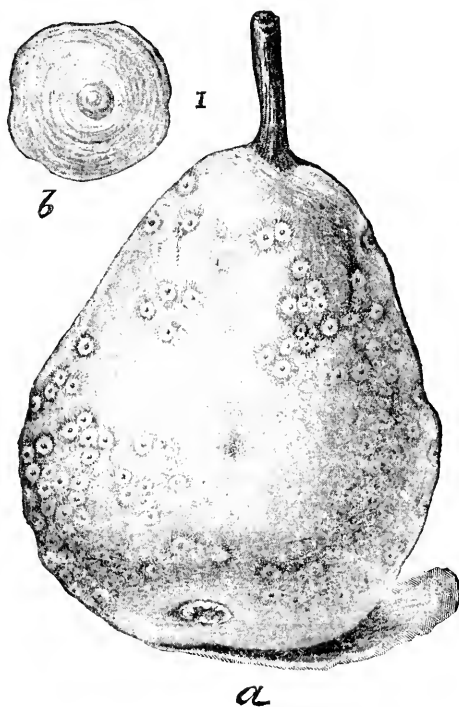


FIG. 1. — *a*. San José scales on a pear. *b*. A female scale enlarged.

quite flat, nearly circular in outline, about one-sixteenth of an inch in diameter, and dark mottled with gray in color, with a small elevated spot at or near the centre, which is black or yellowish.

The male scale is "black, somewhat elongated when fully formed. The larval skin is covered with secretions; its position is marked by a single nipple-like prominence, which is between the centre and the anterior margin of the scale. The scale of the male is more abundant than that of the female. It is often oval in shape and smaller in size than the female."

When these scales occur in large numbers on the twigs (Fig. 2) or leaves they frequently overlap, and are not easily distinguished without a magnifying glass. The general appearance which they give is of a greenish, very slightly roughened scurvy deposit. The natural color of the limbs of the peach and apple is quite obscured when these trees are thickly infested, and they then have the appearance of being coated with lime or ashes. When the scales are crushed a yellowish liquid appears, resulting from the crushing of

\* The cuts used to illustrate this paper are from the United States Department of Agriculture, through the kindness of Prof. L. O. Howard.

the soft, yellow insect beneath, which indicates the existence of living scales on the trees.

These scales are often found on the fruit (Fig. 1), and when present in large numbers they prevent the full development of the fruit, causing it to crack or fall from the tree, or render it unsalable.

The mature male is very small, and supplied with two well-developed wings. It is shown greatly enlarged in Fig. 3, the natural size being indicated by the crossed lines in the small circle below the right wing.

Early in June, in this State, the young crawl out from beneath the scale and spread over the trees. They appear like moving points of a yellowish color, and it is very difficult to distinguish them with the



FIG. 2.—San José scales of natural size on an apple branch; scales somewhat enlarged on apple bark to the left above.

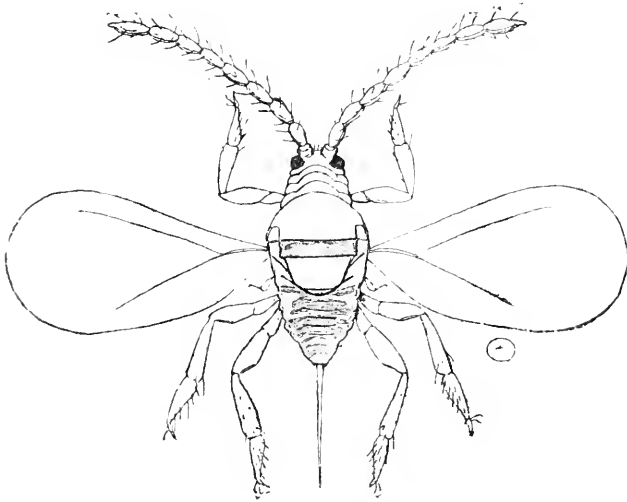


FIG. 3.—Male insect of the San José scale, greatly enlarged.

unaided eye. Fig. 4 represents the insect at this stage of its existence very much enlarged, with its three pairs of legs and one

pair of antennæ (one of which is still more enlarged at *b*), while its long, hair-like beak or proboscis, used for feeding, is shown curled up between its legs.

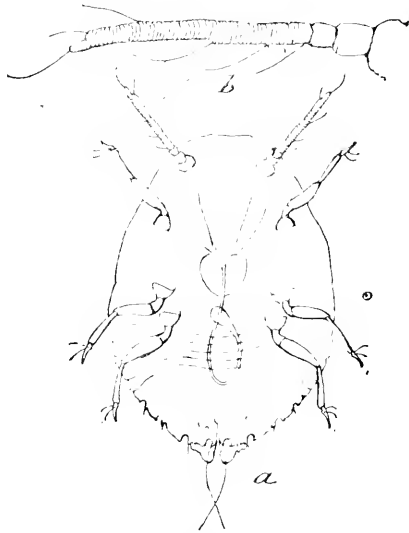


FIG. 4.—*a*. Young larva of San José scale insect, under side, greatly enlarged. *b*. Antenna still more enlarged.

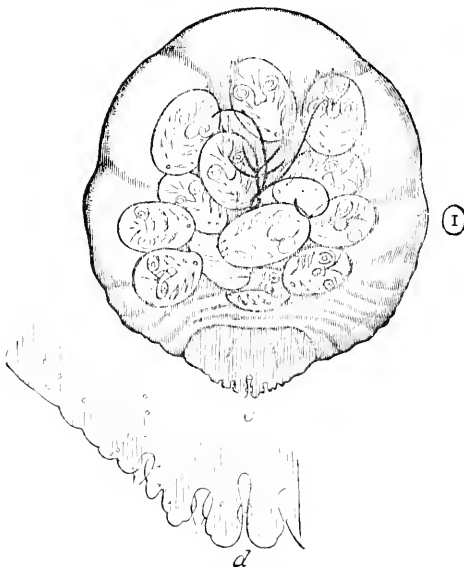


FIG. 5.—*c*. An enlarged view of an adult female of the San José scale insect, containing young. *d*. A portion of its anal fringe still more enlarged.

The mature female, represented greatly enlarged in Fig. 5, is only to be seen by removing her from beneath the scale at the proper stage of development. When the young as described above has reached a satisfactory place of abode in its wanderings, it forces its sharp beak or proboscis into the bark and draws in the sap of the tree, and begins to form its scale. It grows and soon moults its skin, at which time it loses its legs and antennæ, and takes the

form represented in Fig. 5. Several broods of this insect occur in

a season, the exact number of which is still in doubt, but possibly as many as five.

#### FOOD PLANTS.

The list of food plants of the San José scale insect, so far as known, are as follows: apple, pear, peach, plum, cherry, apricot, quince, flowering quince, almond, spiraea, raspberry, rose, hawthorn, cotoneaster, gooseberry, currant, flowering currant, persimmon, elm, osage orange, linden, enonymus, acacia, English walnut, pecan nut, alder, weeping willow and laurel-leaf willow.

#### METHODS OF DISTRIBUTION.

As the mature female is wingless, and fixed to the tree on which she feeds, she will not be likely to cause other regions to become infested unless the tree to which she is attached is removed. Her progeny, however, when they are moving about freely, may be transported to places more or less distant by other insects, birds, larger animals or even by man; but the chances are not favorable for any very wide dispersion in this way. They may, however, be carried from one tree to another at no great distance. Infested fruit may be transported from one part of the country to another, and by chance be left in some place where it is possible for the young to crawl to some suitable food plant; but by far the most favorable method for the wide distribution of this insect is on nursery stock, and to this the most careful attention should be given.

It will be decidedly to the advantage of every dealer in nursery stock to take measures to clean his trees from this scale and to keep them free, for, if this be not attended to, purchasers will find other and more satisfactory parties to deal with.

#### REMEDIES.

If only a comparatively few small trees are infested in a nursery or orchard, the best way is to burn them, taking great care that in doing so none are scattered. There is no method of destroying insects equal to cremation.

Professor Howard, after having a long series of experiments performed for the purpose of ascertaining the best and most economical method of destroying this insect, says: "The only perfect results that have been reached have come from the application of two pounds or more of commercial fish-oil or whale-oil soap to a gallon of water soon after the leaves fall in the autumn, and from the application of a resin wash of six times the normal summer strength. The effects following the application of

these washes leave nothing to be desired. In all cases the most careful search over the sprayed trees has failed to show a living scale." These are known as "winter washes," since they can only be used during the winter without serious injury to the trees. The winter resin wash mentioned above is composed of resin, one hundred and twenty pounds; caustic soda, thirty pounds; fish oil, fifteen pints; water sufficient to make one hundred gallons. The resin and soda are broken up and placed in a large kettle with the oil and sufficient water to cover them; the whole is then boiled for several hours, or until the compound will properly mix in water without breaking up into yellowish flakes. Experiments thus far made with applications during the summer have failed to give a substance that will destroy all of the insects. As good results have been obtained from the use of ordinary kerosene emulsion as from any other substance. It was found advisable, however, to repeat the spraying at intervals of about a week, as the young are brought forth in succession during the season. Kerosene emulsion is composed of kerosene oil, two gallons; common soap, one-half pound; water, one gallon. Cut up the soap and boil it in the water till it is all dissolved, then add it, boiling hot, to the oil, and churn it briskly for five minutes or more with a spraying or force pump. When required for use mix thoroughly one part of the above emulsion with nine parts of water and spray the trees with it. In spraying peach trees, however, it is recommended, because of their liability to injury, to mix one part of the emulsion with fifteen parts of water. The emulsion will dissolve more readily if hot water be used.

#### LEGISLATION.

It is strongly recommended by some entomologists to have laws passed requiring nurserymen and other dealers to guarantee their stock free from the San José scale; but I am free to confess that I feel very doubtful about this matter. It seems to me that the fear of loss of trade will be a greater incentive to send out only uninfested stock than the fear of any amount of legislation.







MASSACHUSETTS  
CROP REPORT

FOR THE

MONTH OF SEPTEMBER, 1895.

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ISSUED BY

WM. R. SESSIONS

SECRETARY STATE BOARD OF AGRICULTURE.

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# CROP REPORT FOR THE MONTH OF SEPTEMBER, 1895.

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OFFICE OF STATE BOARD OF AGRICULTURE,  
BOSTON, MASS., Oct. 1, 1895.

Bulletin No. 5, Crop Report for the month of September, is herewith presented. Particular attention is called to the article on "Insecticides," by the assistant entomologist of the committee on gypsy moth, insects and birds, at the end of this bulletin.

## PROGRESS OF THE SEASON.

Report No. 130 (September, 1895) of the Statistician of the United States Department of Agriculture shows a decline in the condition of corn to 96.4 from 102.5 in the month of August. The prospects of the crop have suffered from drought during the month in the surplus-producing States of Ohio, Indiana, Illinois, Iowa and Nebraska. In the South the indications are that the crop will be the largest ever produced.

The general condition of wheat, considering both spring and winter varieties, when harvested was 75.4, against 83.7 last year and 74 in 1893.

Condition of oats when harvested: general average, 86, an improvement of 1.5 over August. In 1894 the final report of condition was 77.8; and in 1893, 74.9. In the States of largest production the condition is considerably below the general average.

Condition of rye at time of harvest, 83.7; little change since August. Last year, 86.9; in 1893, 82. Crop in the East and South generally good, the average being lowered by condition in western States.

Five-sixths of the product of barley in 1894 were produced in six States, which, with the condition at harvest the present year, are here given, viz.: New York, 90; Wis-

consin, 87; Minnesota, 95; Iowa, 92; North Dakota, 93; California, 83. General average for the country, 87.6, against 71.5 in 1894.

Condition of buckwheat 87.5, against 69.2 last year. New York and Pennsylvania, producing more than two-thirds of the crop in 1894, each have a condition of 88.

Cotton shows a decline in condition since the August report of 7.1 points, or from 77.9 to 70.8. This makes the lowest September condition of the plant since 1881. The crop suffered severely from the drought of August and the excessive rains which succeeded it. Boll-worms have done much injury and the crop has also suffered from shedding and rust.

The general average condition of potatoes is 90.8, against 89.7 a month ago, and 62.4 in 1894. Where the condition is low, drought is the cause most frequently assigned. There is some rot in New England, New York, New Jersey and Pennsylvania. The returns for sweet potatoes indicate considerably less than a full crop, conditions ranging from 101 in Florida down to 70 in Ohio. Drought has been the most common cause of injury.

Average condition of tobacco 82.6, only one-tenth of a point below the condition of August. New York lost 25 points, Virginia 11 points and Ohio 9 points, chiefly owing to drought. The prospect is much brighter than last year, when the September condition stood at 74.5.

The acreage under clover seed is returned as 68 per cent of that of 1894. The condition, 64.4, is lower than in any recent year with the exception of 1894, when it stood at 63.3.

The average condition of apples is now 72.8, and of peaches 84.1, a gain of 1.6 points for the former and of nearly 1 point for the latter. Grapes range from one-half to a full crop in the eastern and middle States. In California the quality is fully up to the average, but the quantity in many sections is from 15 to 25 per cent short.

Condition of sorghum generally fine, the lowest figures being reported from the more southern localities. The crop gives somewhat better promise than at the same date last year.

The highest condition reported for sugar cane, 96, is found in Georgia; the lowest, 80, in Texas. The September conditions last year ranged from 89 in Texas to 100 in Louisiana.

Rice shows a marked improvement in condition, the general average having advanced 10 points during August and now stands at 94.5.

The number of stock hogs for fattening shows a decrease of 7.4 per cent as compared with last year. Principal cause for decrease, scarcity of feed.

In Massachusetts the average condition of corn September 1 is given as 105; the average condition of rye when harvested as 96; the average condition of oats when harvested as 106; the average condition of barley when harvested as 100; the average condition of buckwheat September 1 as 86; the average condition of potatoes as 86; the average condition of tobacco as 114; the average condition of apples as 56; the average condition of peaches as 90; the average condition of grapes as 86; the number of stock hogs fattening as compared with last year as 97; the average condition of stock hogs as to weight and size as 101.

## TEMPERATURE AND RAINFALL FOR THE WHOLE COUNTRY.

FROM UNITED STATES WEATHER-CROP BULLETINS.

*Week ending September 2.* — Week warmer than usual throughout the Mississippi and Missouri valleys and thence eastward to the Atlantic coast, except over northern New England and limited areas in the upper Lake region. Over the western portion of the plateau region and on the Pacific coast week decidedly cooler than usual. Elsewhere the daily temperature differed but slightly from the normal. From central and southern Texas northward over Kansas and southern Nebraska, and thence eastward over limited areas as far as southern New England, the weekly rainfall exceeded the average. More than an average also fell along the south Atlantic coast. Elsewhere the rainfall was below average, and over a considerable portion of the Lake region no appreciable amount of rain fell. Week generally favorable for maturing and securing crops and for ploughing and seeding. Late corn generally improved and

maturing rapidly. Cotton picking quite general over the southern portion of the cotton belt. Much tobacco cut and housed under favorable weather conditions. Frosts general Saturday and Sunday from Montana eastward to Michigan.

*Week ending September 9.* — In nearly all districts east of the Rocky Mountains week warmer than usual. On the Pacific coast and over the central and northern plateau districts week cooler than usual. The greater portion of the country east of the Mississippi has received less than the usual amount of rain during the week. Abundant rains in limited sections in the interior of the country. In the southern States and throughout the Rocky Mountain plateau and Pacific coast regions the season has been cooler than usual. Elsewhere the temperature has been greater than usual, the excess being generally over 1°. The seasonal rainfall is decidedly deficient in the Lake region and generally throughout the States of the central valleys. In New England, the middle Atlantic States and other limited sections the rainfall has been slightly deficient. Elsewhere it generally exceeded the average. Cutting of corn has progressed rapidly, and much of the early crop is in shock. Cotton picking has progressed favorably and is now general over the southern portion of the cotton region. The weather during the week has been especially favorable for cutting and housing tobacco.

*Week ending September 16.* — Week warmer than usual in all districts east of the Rocky Mountains except northern New England. Throughout the central valleys and middle Rocky Mountain slope the week was exceptionally warm. On the Pacific coast and over the northern plateau region week cooler than usual. Over most of the country east of the Rocky Mountains the week was drier than usual, though abundant rains fell in some sections. On the Pacific coast from central California northward the week has been remarkable for its unusually heavy rainfall. The warm and dry weather of the week has forced late corn to rapid maturity and the weather has been very favorable for harvesting. Cotton picking is now general in the northern portion of the cotton region, and well advanced in the southern portion.



The week has also been favorable for housing and curing tobacco.

*Week ending September 23.*—Week warmer than usual in all districts east of the Rocky Mountains except on the northern slope of the Rockies and in extreme southern Florida. The maximum records for one or both of the second and third decades of September were broken in nearly all the stations of this region. Week cooler than usual in the plateau region and on the Pacific coast freezing temperatures occurring in many places. From Wyoming and Colorado eastward over the upper Missouri valley, Minnesota and the upper Lake region more than the usual amount of rain fell. Less than the usual rainfall on the Pacific coast. Elsewhere, except over limited areas, no appreciable amount of rain fell. This is the second successive phenomenally warm week over most of the country east of the Rocky Mountains. Corn is now generally safe from frost. Cotton picking has made good progress. Fall ploughing and seeding much delayed, owing to drought. Freezing temperatures with snow in the central and northern Rocky Mountain regions put an end to the growth of vegetation and caused much injury.

#### SPECIAL TELEGRAPHIC REPORTS.

*Week ending September 2.*—Boston: Some damage by frost on 2d on low lands where not protected by fog; favorable growing and ripening weather for most crops; potato decay not increasing; corn maturing slowly; apples dropping.

*Week ending September 9.*—Boston: Warm and dry with plenty of sunshine; crops are ripening and being harvested very fast; rain badly needed for pastures, meadows, late forage crops, fall seeding and water supplies; apples dropping badly.

*Week ending September 16.*—Boston: Warm first of week with heavy frosts in north and light frosts in south portion, but no serious damage resulted, as crops are mostly out of way; heavy rain, wind and hail storms across central districts on 11th, doing considerable damage in Connecticut valley.

*Week ending September 23.*—Boston: Very hot and dry; fine weather for curing crops, and harvesting is progressing fast, but fruit is dropping badly, and newly seeded fields are being damaged; rain greatly needed; most water supplies extremely low.

#### MASSACHUSETTS WEATHER FOR SEPTEMBER, 1895.

September in Massachusetts has been warmer than usual, with less precipitation and clouds and with generally pleasant weather, favorable for ripening crops and harvesting. At Boston the mean temperature for the month was about  $3.6^{\circ}$  a day warmer than the normal. At Somerset the daily excess was about the same, and at Fitchburg it averaged  $2^{\circ}$  a day. The warmest spell of weather for the month, and at many places the warmest for the season, was on September 21 to 23. The maximum temperature was generally between  $95^{\circ}$  and  $100^{\circ}$ . The coldest spell was on the 14th to 16th at most places, when the mercury fell below  $40^{\circ}$  at many places and light frosts occurred in valleys. No great amount of damage was done. The precipitation was comparatively light in all sections, and at the end of the month water supplies were unusually low. No crops have suffered seriously for want of water, although newly seeded land has not done so well as one would wish for and some late garden crops have ripened prematurely. At Boston the rainfall was 1.64 inches less than the normal amount, and at Somerset the deficiency was 1.55 inches. The weather for harvesting grain, corn, tobacco, etc., has been excellent, and there have been few seasons when crops have been gathered in better condition. There has been hardly moisture enough in the air for the best curing of tobacco, however, and cranberries, tomatoes and apples were badly scalded by the hot sun on the 21st to 23d. Apples ripened up fast, but the high wind of the last week following the hot weather caused them to drop badly in many orchards. During a thunder-storm at East Foxborough on the 9th a barn was struck by lightning and burned, with five horses, two cows and ten tons of hay.

In the circular to correspondents returnable September 25 the following questions were asked:—

1. How does the crop of Indian corn compare with an average crop?

2. Are the rowen crop and fall feed up to the usual average?

3. Has the average amount of fall seeding been done, and what is its present condition?

4. How does the onion crop compare with an average crop?

5. Are potatoes an average crop in yield and quality?

6. What is the prospect for root crops?

7. How have the apple, pear, peach, grape and cranberry crops turned out?

Returns have been received from 110 correspondents, and from these the following summary has been made up:—

#### INDIAN CORN.

The promise held out last month seems to have been fulfilled, and the corn crop for this year is reported to be unusually large. The stover is large and in almost every instance well eared out. The crop is now entirely beyond danger from frosts and is cut and stoked in most sections. The weather the past two weeks has been remarkably favorable for harvesting. Some damage to fodder corn is reported from the recent frosts, but nothing particularly serious. Silos are reported as well filled in all sections.

#### ROWEN AND FALL FEED.

For the State as a whole rowen and fall feed will fall below the usual average. This is particularly true of the four western counties, where the condition is reported as considerably below average. Over the rest of the State the condition approximates quite closely to average, but must nevertheless be considered as a little off. This falling off in condition is due to the drought of September, and to the excessively hot weather of the latter part of the month.

#### FALL SEEDING.

Very nearly, if not quite, the usual amount of fall seeding has been done. It is generally reported as looking well,

though many complaints are made of the seed starting slowly on account of lack of rain. Most correspondents agree that rain is needed at the present time, and unless the drought is broken soon, fall seeding will show a material falling off in condition.

#### ONIONS.

All reports go to indicate that the present crop of onions is one of the largest, if not the very largest, ever raised in the State. This is particularly true of the sections of commercial production, from all of which unusually heavy crops are reported. The quality is generally excellent, although there is some little complaint of thick necks in some sections. Prices rule very low; sales as low as 25 cents per bushel being reported.

#### POTATOES.

For the State as a whole potatoes appear to be more than an average crop, many correspondents speaking of them as above average and only a few as below. The quality is generally reported to be good, tubers being large and free from scab. Rot has appeared in many localities, and in some has operated to materially reduce the crop both in yield and quality. However, rot cannot be said to be generally prevalent to a dangerous degree.

#### ROOT CROPS.

Root crops promise to be good in nearly all sections of the State. There is some little complaint of turnips suffering from blight and from the excessively hot weather of the latter part of the month, but this will not materially affect the crop as a whole.

#### FRUITS.

Apples are a very light crop in all sections, and many complaints are made of inferior quality in the fruit. Probably one-fourth of an average crop would be a sufficiently high estimate for the State at large. Pears and peaches are considerably in excess of average crops and generally of good quality. Grapes are a good average crop of good quality. Cranberries are not quite an average crop though nearly up, good crops being reported in many towns.

## NOTES OF CORRESPONDENTS.

(Returned to us September 25.)

## BERKSHIRE COUNTY.

*Becket* (WM. H. SNOW). — Indian corn is fully an average crop. Rowen and fall feed are not up to the usual average. The average amount of fall seeding has been done and looks very well considering the dry weather. Onions are about an average crop. Potatoes are an average crop in yield and quality. Root crops are looking well. Apples are a light crop and pears and grapes nearly an average.

*Lee* (A. BRADLEY). — Corn is 10 per cent above an average crop. Rowen and fall feed are not more than 80 per cent of the usual average. Less than the average amount of fall seeding has been done as it is too dry. Potatoes are from 15 to 25 points above average in yield and the quality is of the best. Root crops are nearly up to the average in condition. The apple crop is somewhat better than was anticipated. These reports help us much; we have saved dollars by them.

*Stockbridge* (F. A. PALMER). — Corn is about an average both for silo and grain. Rowen and fall feed not more than 80 per cent of the usual condition. The dry weather has kept some farmers from seeding, but all that is done looks well. Onions about an average crop. Potatoes very fine; more than an average in yield and quality. Roots promise to be an extra good crop. Apples a poor crop and fruit imperfect; pears and grapes good.

*Hinsdale* (S. M. RAYMOND). — There is rather more than an average crop of corn. Rowen and fall feed are very poor in this section. More than the average amount of fall seeding has been done and it is looking finely. Potatoes are an average crop in yield and quality. There are but few roots raised but those are good. All kinds of fruit are very small crops and of poor quality.

*Hancock* (C. H. WELLS). — The corn crop is the best in five years. Rowen and fall feed are not up to the usual average. Very little fall seeding has been done. Potatoes are a full crop of excellent quality; very few pieces rotting. Apples are about half a crop, but pears are a little better.

*Cheshire* (L. J. NORTHUP).—Indian corn will average 10 per cent more than usual. No rowen or fall feed to speak of. The average amount of fall seeding has been done, but it is too early to report on condition. Potatoes are more than an average yield and of first-class quality. Root crops promise well. Apples are a fair yield; pears a large yield; grapes plenty.

#### FRANKLIN COUNTY.

*Charlemont* (H. S. GILES).—Indian corn has matured well and is above the average. Rowen is a very good crop but not so large as some years; owing to dry weather fall feed is poor. The average amount of fall seeding has been done, but the condition is below average on account of the dry weather. Onions are more than an average crop. Potatoes are above the average in yield, but there are some imperfections in the crop. Root crops promise to be very good. Apples are considerably below an average; pears, peaches and grapes about average.

*Colrain* (A. A. SMITH).—Corn is one-fourth better than an average crop. Rowen and fall feed are below the usual average. Less than the average amount of fall seeding for this season of the year has been done. Onions are fully an average crop. Potatoes are an average crop in both quantity and quality. The prospect for root crops is good. Apples, pears, peaches and grapes have all turned out better than was expected.

*Conway* (J. C. NEWHALL).—Corn is more than an average crop. Owing to the severe dry weather neither rowen nor fall feed is up to the average. There has not been much seeding except where tobacco was harvested, and it is so dry that seed starts very slowly. Onions are a good crop. Potatoes are more than an average in yield but there is some complaint of rot. The prospect for root crops is fair. The apple crop is short and very poor, but pears, peaches and grapes are more than an average. It is very dry and many springs and streams have failed that never failed before.

*Sunderland* (J. M. J. LEGATE).—Corn is a good deal above the average in both yield and quality. Rowen and fall feed are much below the usual average. Little seeding done except in corn; that is looking well. The onion crop is above the average, though there are many pieces with thick necks that will never cure to make good onions. Potatoes are above an average crop and the quality is generally good though there is some complaint of rot in the cellar. Root crops are looking well. Apples are a good crop but dropping badly; pears, peaches and grapes are good crops. Prices are generally very low.

*Northfield* (T. R. CALLENDAR). — Indian corn is more than an average crop. Rowen and fall feed are both better than for the past three years. Only a small amount of early seeding has been done but it is looking well. Potatoes are much more than an average crop both in yield and quality. The prospect for root crops is good. Apples are hardly an average crop though better than was expected after the early frost. A severe frost on September 14 did considerable damage to standing corn fodder.

*New Salem* (DANIEL BALLARD). — Corn is above an average crop. Rowen and fall feed are a little below the average. The average amount of fall seeding has been done and is doing well though rain is needed. Onions are a good crop so far as raised. Potatoes are above the average in yield and of good quality. Roots promise to be a fair average crop. Apples light and of poor quality; a good crop of pears, peaches, grapes and cranberries.

#### HAMPSHIRE COUNTY.

*Enfield* (D. O. CHICKERING). — Indian corn is rather above an average crop. Rowen and fall feed are up to the usual average. The average amount of fall seeding has been done and it is looking well. Potatoes are more than an average crop in yield and of fine quality. Root crops promise to be good. The fruit crop is uneven, owing to late frosts in the spring and early frosts in the fall. Pears and peaches good crops.

*Belchertown* (H. C. WEST). — Indian corn is 20 per cent above average at a low estimate. Grass, either on mowing lands or pastures, has not recovered from last year's drought. Comparatively little fall seeding has yet been done hereabouts but that little has started well. Potatoes are above the average both in yield and quality. Root crops promise to be fair. Apples are very nearly up to the average in quantity but below in quality; pears never were better; peaches are an average crop of good quality; and grapes are a fine crop in quantity and quality.

*South Hadley* (H. W. GAYLORD). — There is a large growth of fodder on most corn fields but some complaint that the ears are not in proportion to the stalk. Rowen is from one-half to two-thirds of an average crop; dry weather has injured fall feed. Fully the average amount of fall seeding has been done and most of it is looking finely. There are onions enough in number but they are under size. Potatoes are an average crop but there is some shrinkage on account of rot and wire worms. Root crops will be good if we have rain at once. Pears and peaches heavy; grapes good; apples about half a crop and not very fair in quality.

*Hatfield* (THADDEUS GRAVES). — With favorable weather for

harvesting, Indian corn will be fully an average crop. The average amount of fall seeding has been done and it is in good condition. Onions are a large crop but prices low. Potatoes are good in yield and quality; very little rot. Prospect for root crops good. Apple crop a little off; pears, peaches and grapes good.

*Southampton* (C. B. LYMAN).—Corn crop never better; ears well filled and no soft corn. Rowen and fall feed about the usual average. Not much fall seeding done as yet, but many are preparing to seed. Onions a very good crop. Potatoes are a large yield of good quality. Roots will be a fair crop. Apple crop small and fruit wormy; pears, peaches and grapes abundant.

*Chesterfield* (HORATIO BISBEE).—The corn crop is fully up to the average. Rowen and fall feed are far behind the usual average. Much more fall seeding than common done, but on account of the dry weather it is not looking well. Potatoes are an average crop in yield, but are decaying quite badly. Root crops are looking fairly well. Apples are a light crop, perhaps less than half; peaches, grapes and cranberries are not much raised.

#### HAMPDEN COUNTY.

*Blandford* (E. W. BOISE).—Corn is fully 10 per cent above an average crop. Hardly any rowen will be cut and fall feed is below average in condition. Less than the average amount of fall seeding has been done and the little that is in looks bad. Potatoes are an average crop in yield and quality. Root crops will be poor. Apples about a three-fourths crop; pears a full crop; cranberries light, owing to spring frosts. While the present season may be called about an average one, the outlook is very poor, owing to the poor condition of mowings and pastures and the smallness of the hay crop.

*Holyoke* (J. C. THORPE).—Indian corn is about 10 per cent above an average crop. There is an average crop of rowen and fall feed is good where not pastured too close. Potatoes are above an average crop, of good quality. Root crops promise to be good. Apples not one-fourth crop; pears a full crop; peaches a fair crop and grapes a full crop.

*West Springfield* (N. T. SMITH).—Indian corn is a full average crop. Rowen is poor except on moist land, and pastures are suffering from lack of rain. Less than the usual amount of fall seeding has been done and it needs rain. Onions are more than an average crop in both yield and quality. Potatoes an average crop of large sized tubers; quality excellent; some rot. Prospect for root crops good, though some pieces of turnips are suffering from heat and beginning to decay. Winter apples are a very light crop; peaches and pears good.



*Ludlow* (C. B. BENNETT). — Corn 5 per cent above an average crop. Rowen and fall feed a little below the usual average. About the usual amount of fall seeding has been done and it is looking well. Potatoes are above the average in yield, but not of extra quality. Root crops are looking very well. Apples and pears are about half a crop, but grapes are a fine crop.

*Wilbraham* (F. E. CLARK). — Corn is 20 per cent above an average crop. Rowen and fall feed below average and many farmers are depending entirely upon soiling. Fully the average amount of fall seeding has been done. Potatoes are a full average yield, but many fields are rotting badly. The prospect for root crops is very fair. Apples half a crop; pears and grapes full average crops. Fall seeding that was sowed early has in many instances failed to germinate and has to be reseeded.

*Monson* (A. H. WHITE). — Corn is a full average crop. Rowen and fall feed are not up to the usual average. The usual amount of fall seeding has been done, but it is growing slowly and is in need of rain. Potatoes are an average crop in yield and quality. Root crops promise to average well with former years. Apples are scarce and dropping badly; pears, peaches and grapes are plenty. Weather good for harvesting crops.

#### WORCESTER COUNTY.

*Warren* (W. E. PATRICK). — Indian corn considerably above an average crop. Rowen and fall feed are about 90 per cent of an average in condition. About the usual amount of fall seeding has been done and it is looking very well. Onions are a good average crop. Potatoes are 25 per cent above an average crop; quality good though there is some complaint of rot. Prospect good for late growth of root crops; great growth of turnips. Apples a failure; pears, peaches and grapes a very large crop.

*North Brookfield* (J. H. LANE). — Indian corn more than an average crop. Rowen and fall feed not up to the condition of former years. Fall seeding has made but little growth. Potatoes are an average crop in yield and quality. The prospect for root crops is fair. Apples 20 per cent of a full crop; pears 60 per cent; peaches 25 per cent; grapes 75 per cent. There are hardly any cranberries, and exposed apples were injured by hail.

*Templeton* (LUCIEN GOVE). — Corn is above average in quantity and of good quality. Rowen is better than last year, but not an average crop; fall feed the same. The usual amount of fall seeding has been done and it is in far better condition than last season. Onions are a full average crop. Potatoes are above an average in quantity, of good quality and with very little rot. The prospect

for root crops is good. Apples are very light, quality poor ; pears rather below average in quantity ; peaches full average, but rotted on trees ; grapes fine.

*Westminster* (I. DICKINSON).—Corn is rather more than an average crop. Rowen and fall feed not up to the usual average ; little better than for the last three years. The average amount of fall seeding has been done and its condition is good. Onions are a very fair crop. Potatoes more than an average crop and quality good. Root crops promise to be very good. The fruit crop has turned out poorly. Vegetation has suffered in the last few days, and rain is needed for late crops.

*Bolton* (H. F. HARNES).—Indian corn is a full average crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and most of it is looking well. Onions are a full average crop. Potatoes are an average crop in yield and quality. Root crops are looking well. No apples ; peaches good ; late frost in the spring damaged grapes. Corn fodder was heavy and silos will be well filled.

*Worcester* (H. R. KINNEY).—Indian corn promises to be an excellent crop. Rowen and fall feed are looking better than for a year or two past. About the usual amount of fall seeding has been done and the early sown looks nicely. Onions look well. Potatoes good in yield and quality, but some pieces have rotted badly. Root crops look promising. Only a very few apples and quality poor ; pears a full crop, but much damaged by hail ; peaches an average crop of good quality ; grapes damaged by frost in many places and some vineyards nearly ruined by hail.

*Spencer* (H. H. KINGSBURY).—Corn is a full average crop. Rowen and fall feed are up to the usual average as temperature and moisture have been favorable. The weather has been very favorable for fall seeding and it is in excellent condition. Onions are an average crop in quantity and quality. The yield of potatoes has been shortened by rot, but the quality is good. The prospect for root crops is very good. Apples are a short crop and much damaged by insects ; pears, peaches and grapes abundant and very low in price ; cranberries a small crop.

*Sutton* (O. P. JOHNSON).—Corn is fully up to the average if not above it. Rowen and fall feed are fully average. The usual amount of fall seeding has been done and it is in splendid condition. The prospect for root crops is fair. Apples a poor crop ; pears, peaches and grapes good ; cranberries average.

*Douglas* (WM. ABBOTT).—Indian corn more than an average crop. Rowen and fall feed up to the usual average. About the same amount of fall seeding done as usual and is looking well.

Onions a large crop where sown. Potatoes a large yield; some pieces rotted badly, others sound and good. Apple crop not worth much; other fruit crops good.

#### MIDDLESEX COUNTY.

*Hopkinton* (W. V. THOMPSON). — Corn is more than an average crop. Rowen and fall feed are up to the usual average. The average amount of fall seeding has been done. Potatoes are an average crop in yield and quality. The prospect for root crops is good. Apples a very light crop; pears plenty; peaches good; grapes fair.

*Marlborough* (E. D. HOWE). — Indian corn is 10 per cent above an average crop. Rowen and fall feed are up to the usual average. Not much fall seeding has been done this year. Very few onions raised here. Potatoes would be an average crop but for blight. Root crops promise to be excellent. Pears abundant; peaches abundant; grapes half a crop; and apples 10 per cent of a full crop.

*Littleton* (G. W. SANDERSON). — Corn is a full average crop. Rowen and fall feed are up to the usual average. A large amount of fall seeding has been done and considerable ground is now in preparation for sowing; what has been sown is looking well. Onions a good crop but few raised here. Root crops are very good; turnips looking especially well. Apple crop light; pears and peaches good; grapes and cranberries not average.

*Westford* (ARTHUR WRIGHT). — Indian corn is a large crop. Rowen and fall feed are up to the usual average. The average amount of fall seeding has been done and it is in good condition. Onions are about three-fourths of an average crop. Potatoes are a better crop than for some years and are average in yield and quality. Roots will be good average crops. The apple crop is very light; pears and peaches fair.

*Winchester* (MARSHALL SYMMES). — Indian corn is not grown in this section. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done; it came up first rate but now needs rain badly. Onions are more than an average crop. Potatoes are an average crop in yield and quality. Very few apples; good pear crop; no peaches grown; grapes more than an average.

*Arlington* (W. W. RAWSON). — Rowen and fall feed are up to the usual average. Fall seeding is at present in good condition. Onions are a very large crop. Potatoes are a good yield, but the quality is poor. Root crops promise to be extra good. All kinds of produce are very large crops, with quality poor and prices low; a heavy frost early would be a good thing.

*Newton* (OTIS PETTEE): — Corn is looking well. The yield of potatoes is fair, but the quality is not quite up to the standard. There are very few apples; pears are an average crop; a prolific yield of grapes; cranberries hardly an average.

#### ESSEX COUNTY.

*Haverhill* (EBENEZER WEBSTER). — Indian corn is more than an average crop. Rowen and fall feed are above the average on moist land. About the usual amount of fall seeding has been done, but it has not come up well on account of dry weather. Potatoes a good yield and quality good except where they have rotted. Root crops promise to be fair. Apples few and poor; pears plenty and not very good; grapes good, and peaches fair in quantity and quality. The ground is very dry; no rain for some time.

*Groveland* (ABEL STICKNEY). — Corn is much more than an average crop. Rowen and fall feed are no more than in average condition and are in need of rain. Less than the average amount of fall seeding has been done; moist ground looks well, high ground is poor. Onions are a very good crop. Apples are a small crop and quality poor; pears are a good crop but the sale is poor; peaches are very fair; grapes plenty.

*Newbury* (G. W. ADAMS). — Corn a full average crop. Rowen and fall feed nearly up to the usual average. The average amount of fall seeding has been done, but the condition is backward. Onions 10 per cent above an average crop. Potatoes above an average yield, but rotting badly. Prospect for root crops good. Few apples except in certain sections of small area.

*Danvers* (C. H. PRESTON). — There is a very good crop of ensilage and field corn. Rowen crop good; fall feed fair. The average amount of fall seeding has been done and is in good condition. Onions a medium crop. There is a fair crop of apples in this immediate vicinity.

*Marblehead* (WM. S. PHILLIPS, Jr.). — While the average field of rowen has not shown a heavy cut, some lands that have been laid down within two years have given a phenomenal yield. Little fall seeding done yet. Onions are fully up to the average. Potatoes are below average in yield, but of good quality. Root crops promise to be very good. The apple crop is not a full one hereabouts, but while few trees show fruit those that are bearing are carrying enormous loads.

#### NORFOLK COUNTY.

*Medfield* (G. R. CHASE). — Indian corn 90 per cent of an average crop. Rowen a full average crop, but fall feed below the

average in condition. The average amount of fall seeding has been done and is in good condition. Potatoes are not an average crop. Root crops promise to be average. Almost no apples; pears abundant; peaches above average; grapes fine; and cranberries a small crop, having been injured by frost in some instances.

*Millis* (E. F. RICHARDSON).—Corn is the best crop for many years. Rowen and fall feed have been up to the average, but the recent drought has put them back. More than the average amount of fall seeding has been done and the condition now is below the average. Potatoes better than an average crop. Prospect for root crops fair. Hardly any apples; pears, peaches and grapes abundant; few cranberries.

*Medway* (M. MORSE).—Indian corn is more than an average crop. Fall feed is fair, but there will be no rowen. About the average amount of fall seeding has been done and is in good condition, especially where sown early. Yield of potatoes large, quality good, but some trouble from rot. The apple crop is very small and nearly worthless. Pears, peaches and grapes are fair to good, except where grapes were cut by spring frosts.

*Franklin* (C. M. ALLEN).—Corn is a full average crop. Rowen and fall feed from 10 to 20 per cent below the average. Less than the usual amount of fall seeding has been done and the plants are weak from drought. Onions an average crop. Potatoes average in yield and quality. Roots promise to be average crops. Apples a very poor crop; pears, peaches and grapes very good. The dry weather of the last month has shortened the growth of many crops.

#### BRISTOL COUNTY.

*Mansfield* (WM. C. WINTER).—Indian corn about an average crop. Rowen and fall feed above the average in condition. About the usual amount of fall seeding done and looking well. Few onions grown, but crop up to average. Late potatoes an average crop in quantity and quality. Root crops will be up to average. Winter apples and peaches not over 20 per cent of an average crop; pears 65 to 75 per cent; grapes possibly 50 per cent; cranberries considerably under average crop if picked in good condition; some bogs have been injured by early frosts.

*Attleborough* (ISAAC ALGER).—Indian corn is above an average crop. Rowen and fall feed are up to the usual average. The usual amount of fall seeding has been done and is in good condition. Potatoes are an average crop in yield and quality. Root crops promise to be fair. No apples; pears good; peaches fair; grapes fair and cranberries below the average.

*Raynham* (N. W. SHAW). — Corn is above an average crop. Rowen and fall feed have fallen off in condition, owing to the dry weather. Less than the usual amount of fall seeding has been done, owing to its being so dry; the farmers are waiting for rain. Potatoes are above the average both in yield and quality. The prospect for root crops is very good. No apples; few peaches; grapes a full crop and cranberries not a full yield.

*Dighton* (J. N. PAUL). — Corn compares well with an average crop. Rowen and fall feed are up to the usual average. The average amount of fall seeding has been done and is in good condition. Onions are more than an average crop. The prospect for root crops is good. Apples are very poor; pears, peaches, grapes and cranberries very good.

*Dartmouth* (L. T. DAVIS). — Corn is fully up to the average. Rowen is about an average crop; fall feed has been very good, but is getting dry now. The average amount of fall seeding has been done; some pieces are very fine, while others need rain. Onions are a very good crop. Potatoes have made an average yield, but the blight struck the vines too soon to make the quality first class. Root crops are not so good as in some years. All kinds of fruit are very poor.

#### PLYMOUTH COUNTY.

*Brockton* (DAVIS COPELAND). — Ensilage corn is a good crop; no field corn grown. Rowen and fall feed are up to the usual average. The average amount of fall seeding has been done and is in fair condition. Potatoes are an average crop in yield and quality. Root crops promise to be good. Scarcely any apples; pears, peaches, grapes and cranberries good.

*West Bridgewater* (F. E. HOWARD). — Indian corn is above an average crop. Fall feed may be average, but rowen is not quite up. The usual amount of fall seeding has been done and is in good condition. Onions are better than an average crop. Potatoes are average in yield and quality though they have rotted slightly in some places. Root crops promise to be first rate. Apples scarce and of inferior quality; pears, peaches and grapes plenty and good; the frost injured cranberries in some localities, otherwise the crop is good.

*Hanson* (F. S. THOMAS). — Corn is a full average crop. Rowen and fall feed are up to the usual average. More than an average amount of fall seeding has been done and the condition is fine. Potatoes are excellent in quality and of satisfactory quantity. Root crops promise to be good. Very few apples; pears quite plenty; good crop of peaches and grapes; not a great crop of cranberries.

*Kingston* (J. H. CUSHMAN). — Corn is more than an average crop. Rowen is about a two-thirds crop and fall feed is poor. There has been more than the usual amount of fall seeding done and it is looking well. Onions are more than an average crop and of good quality. There is good prospect of a large crop of potatoes. Apples light; pears good; grapes heavy and cranberries fair.

*Middleborough* (ELBRIDGE CUSHMAN). — Corn is fully 15 per cent better than an average crop. Rowen and fall feed are better than usual. The average amount of fall seeding has been done and it is looking well, although the surface of the ground is getting dry. Onions are fully an average crop. Potatoes are one of the largest crops ever known, excellent in quality and with but little rot. The prospect for root crops is fair. Pears, peaches and grapes very good; cranberry crop average; apples poorest for years, practically no Baldwins and very few Greenings.

#### BARNSTABLE COUNTY.

*Barnstable* (JOHN BURSLEY). — Indian corn a full average crop. Rowen and fall feed are hardly up to the average. A full average amount of fall seeding has been done; much of it is late and very little is looking well. Onions are a good average crop. Potatoes are an average crop in yield and quality. Root crops promise to be fair. Apples a light crop; pears very heavy; few peaches; grapes fair; cranberry crop above an average. Cranberries were touched with frost on the morning of September 16 in some localities.

*Eastham* (J. A. CLARK). — Acreage of Indian corn small, but crop good. Rowen and fall feed are up to the usual average. More than an average crop of potatoes. Turnips have blighted badly. Apples are a poor crop; cranberries will be an average crop.

*Dennis* (JOSHUA CROWELL). — Corn is a full average crop. September has been very dry and rowen and fall feed are not up to the usual average of condition. Not much fall seeding has been done. Onions are about an average crop. Potatoes are a large crop, but are rotting somewhat. Root crops have suffered somewhat from lack of moisture. Apples are very scarce; pears a fair crop; grapes quite plenty; cranberries about half a crop, some damage from frost on the 16th, but much more from the excessive heat of the 21st, 22d and 23d.

*Brewster* (J. H. CLARK). — Indian corn is better than an average crop. Rowen and fall feed are fully up to the average. The usual amount of fall seeding has been done and is in good condi-

tion. Onions are fully as good as in average years. Potatoes are more than an average crop in yield and quality. The prospect for root crops is very good. The apple crop is very light; other fruit crops are very good.

#### DUKES COUNTY.

*West Tisbury* (GEO. HUNT LUCE). — Corn is about an average crop. Rowen and fall feed were looking very much better than the average until the dry weather set in, but unless it rains soon fall feed will be a failure. Not much fall seeding is done here. Potatoes are better than an average crop in both quality and quantity. Unless we get rain soon the prospect for root crops will be poor. Apples, pears and peaches are very poor crops; grapes are a good crop.

#### NANTUCKET COUNTY.

*Nantucket* (C. W. GARDNER). — Indian corn is about an average crop. Rowen and fall feed are rather better than the usual average. The usual amount of fall seeding has been done and is looking well. Onions are a better crop than for the last two years. Potatoes are nearly an average crop in quantity and quality. Root crops promise to be very good.



BULLETIN OF  
MASSACHUSETTS BOARD OF AGRICULTURE.

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*INSECTICIDES.*

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By A. H. KIRKLAND, ASSISTANT ENTOMOLOGIST.

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Insect attacks of various kinds are chief among the causes which hinder the successful development of crops, and, if neglected, too often set at naught the labors of the farmer or gardener. Thanks to the discoveries of modern science we are now able in nearly all cases to find a means of checking these ravages by simple remedies if employed at the right time. A brief digest of our present knowledge of insecticides is given herewith in the hope that, while it presents but little that is new, it may prove in some measure helpful.

The feeding habits of insects attacking the exterior parts of plants afford us a ready means of separating them into two general groups, biting insects (various caterpillars, beetles, etc.) and sucking insects (plant lice, scale insects, etc.). The members of the first group devour the substance of the plant by means of their jaws, while those of the second group secure their nourishment by the aid of a slender beak inserted into the plant tissues. The substances to be used in the destruction of insects are determined in great measure by these feeding habits and may in like manner be separated into two classes: first, internal poisons used against biting insects; and second, external irritants or contact insecticides employed in destroying insects of the second group. The desirable qualities of an insecticide of either class are:—

1. That it should kill quickly.
2. That it should not burn the foliage or otherwise injure the plant.
3. That it should be cheap enough to be of practical value.

In addition to these requisites an insecticide of the first class should be capable of remaining upon the foliage in an effective condition for a considerable period of time.

Various arsenical compounds have proved to be the most satisfactory internal poisons, those commonly used being London purple and Paris green. To these should now be added a third, arsenate of lead.

#### LONDON PURPLE.

This substance is a waste product in the manufacture of certain dyes, and contains a more or less soluble form of arsenic. Against leaf-feeding insects in general it is a very effective insecticide, but should be used with care, especially on trees with tender leaves (peach, plum, etc.), since burning of foliage often results from an application of too great a strength. One pound of the poison should be mixed with one hundred and fifty to two hundred gallons of water and applied as a spray. It can be purchased at retail for about fifteen cents per pound.

#### PARIS GREEN.

Paris green has been and is the farmers' favorite munition of war against the common insects of the first group. It retails at about twenty-five cents per pound, and is too generally known to need description. Professor Fernald of the Agricultural College at Amherst estimates that \$76,000 worth of this substance is used annually in this State in combating the potato beetle. This poison can be applied in a variety of ways, according to the habits of the pest it is intended to destroy. A common and effectual way of applying it to potato plants to destroy the potato beetle, and one which I have often used with good success, is to enclose a quantity of the dry poison in a small bag fastened at the end of a short rod and with it lightly dust the plants by holding the bag over the potato hills, at the same time striking the rod with a short stick held in the other hand. Sometimes burning of the foliage results from this treatment, and if used on a windy day there is presumably more or less danger to the operator from poisoning. Another excellent method for using the poison on low-growing plants consists in mixing one part Paris green with thirty to fifty parts plaster, ashes, or, perhaps best of all, wheat-middlings, applying the mixture to the plants by means of a sieve early in the morning before the dew has dried off. This forms a slight paste which causes the poison to adhere to the foliage for a considerable period. Probably the oldest and most common method of application to both plants and trees is the mixture of Paris green suspended in water and applied as a spray. This method, like the others, does not eliminate the danger of burning the leaves when the mixture is too strong, but to do the most effective work it is good policy to use the mixture

as strong as possible without causing serious injury to the foliage. Experiments have shown the average burning point to be below the proportion of one pound of Paris green to one hundred and fifty gallons of water. The addition of lime to the mixture is recommended by some entomologists. This is thought to neutralize the small amount of free arsenious acid in the Paris green, thus preventing in some degree the danger of burning the foliage. Care must be taken, however, not to add too great a quantity of lime, since otherwise a more soluble compound and one of greater burning powers will be formed.

#### ARSENATE OF LEAD.

This new insecticide, which was discovered by Mr. F. C. Moulton while experimenting under the direction of the State Board of Agriculture in connection with the work of exterminating the gypsy moth, has proved so far to be the best of any of the arsenical compounds. It may be prepared by mixing approximately thirty parts by weight of arsenate of soda dissolved in water and then adding seventy parts acetate of lead also dissolved in water. As a result of the chemical reactions which take place arsenate of lead is thrown down as a finely divided white precipitate which readily remains suspended in water. This poison may be purchased in bulk in the market at about fifteen cents per pound. Weight for weight it does not appear to be quite as effective as either London purple or Paris green, but since it will not burn the most delicate foliage when used at a killing strength it is pre-eminently the best insecticide of the class. Notwithstanding the fact that the poison has not proved all that was hoped for it when used against the gypsy moth, — since a large proportion of the caterpillars of this remarkably hardy insect have been known to feed unharmed on foliage sprayed with great strengths of the poison, — it has proved very effective against ordinary insects and its use is to be highly recommended. It can be safely applied to plants either clear or mixed with plaster, middlings, etc., as in the case of Paris green, or used on both plants and trees as a spray when mixed with water at the rate of two to four pounds to one hundred and fifty gallons. Twenty pounds to one hundred and fifty gallons of water have been used in many experiments against the gypsy moth without apparent injury to the foliage. Another advantage of this poison is that it leaves a faint white coating on the foliage, thus indicating the places sprayed. I have seen trees that were sprayed in June and yet showed the coating plainly in August.

The chief value of arsenate of lead, however, lies in its insolubility in water, which obviates the danger of burning the foliage.

This has always been the principal objection to the use of arsenicals, since foliage "burned" soon falls to the ground, and a tree thus deprived of its leaves in the middle of a season is of course unable to ripen its fruit or successfully complete the year's growth of wood, and, in addition, is materially injured by the exhaustion of the reserve force necessary to produce the second crop of leaves which most species of deciduous trees bring forth when defoliated early in the season. Thus the damage to the tree from "burning" is often as great as that from defoliation by insects. The burning effect on leaves of arsenical poisons depends on the destruction of the living contents (protoplasm) of the cells which go to make up the leaf, as is shown by the illustrations which follow.

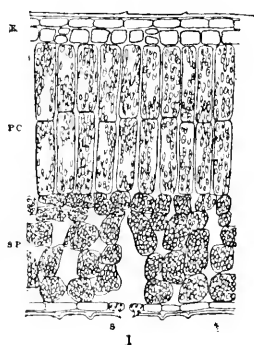


FIG. 1 (original). Section through normal leaf of pig-nut hickory (*Carya porcina*), showing structural elements. E, epidermis; PC, palisade cells; SP, spongy parenchyma; S, stoma or breathing pore.

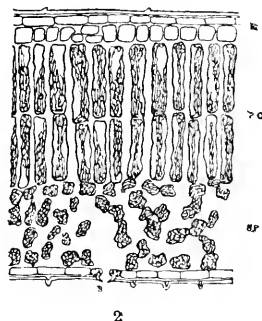


FIG. 2 (original). Section through leaf of same tree "burned" by excess of Paris green. Cell contents (protoplasm) of palisade cells and spongy parenchyma dead and dried up; cell walls shrivelled.

#### HOW TO USE THESE POISONS AGAINST COMMON INSECTS.

Spraying with a force pump is the best method of applying these poisons to trees. It is well to add from two to four quarts of glucose or cheap molasses for every one hundred and fifty gallons of the poison mixture used, as this causes the poisons to adhere to the foliage. To destroy the bud moth (*Tmetocera ocellana*), spray when the buds begin to swell; against the codling moth (*Carpocapsa pomonella*), spray just after the petals have fallen from the blossoms. The tent caterpillar (*Clisiocampa americana*), the canker-worms (*Anisopteryx pometaria*, *Paleacrita vernata*), as well as the tussock moth (*Orgyia leucostigma*) and the elm leaf beetle (*Galeruca xanthomelona*) can be cleared from infested trees by one or more thorough sprayings soon after the insects make their appearance.

## CONTACT INSECTICIDES.

Against insects of the second group previously mentioned (*i. e.*, sucking insects) a different means of attack must be employed, for, as they do not take in solid nourishment, a poison applied on the foliage or stems, as in the case of arsenic compounds, would be of no value. From the nature of their feeding habits they are not as active as the biting insects and often remain fixed in one place for a long time, thus rendering their destruction easy through those insecticides which kill by contact. The general effect of contact insecticides is to suffocate the insects by closing the breathing pores, either by coating them over with a film or inducing an irritation which closes them. The most practical and hence most prominent insecticide of this class is kerosene emulsion, the formula for which as given by Professor Fernald is presented herewith.

*Kerosene Emulsion.*

“This most useful insecticide is prepared in the following manner: One-quarter of a pound of common bar soap is dissolved in two quarts of boiling water, and while still hot four quarts of kerosene oil are added and the whole mixture churned through a small hand force-pump with the small nozzle turned into the pail. This churning must be continued about five minutes, until the whole forms a creamy white mass which becomes jelly-like when cool. Care must be taken to have the soap solution *hot* when the kerosene is added to it and the churning done, but it must not be near a fire.

“Before applying the emulsion to plants it should be diluted with water in the proportion of one quart of the emulsion to nine quarts of water, which must be thoroughly mixed. The above will make sixty quarts of insecticide ready for use, but the emulsion will keep for a long time without injury and may be diluted at the time of using. This insecticide is said to be one of the best substances for the destruction of vermin on domestic animals and in hen houses.”

The dissolving of the soap requires considerable time, and I find that the emulsion may be prepared more expeditiously and equally as effectively by use of the same or a little greater quantity of any good soap powder in place of the bar soap. The common soap powders readily dissolve in hot water, thus obviating the necessity of cooking the mixture over a stove, and so far as I have observed make an excellent emulsion. Samples prepared four weeks ago are as permanent as when made, and I see no reason why they

will not keep as well as the emulsion made with hard soap. Their killing properties are equally as good and they do not damage the foliage. Kerosene emulsion is an invaluable remedy against nearly all plant and bark lice and for this purpose it should be applied as a spray.

#### RAUPENLEIM, ETC.

Another class of insecticides, or perhaps more properly "insect-traps," includes the various mixtures for banding trees to prevent the ascent of injurious insects. Chief among these are coal tar, printers' ink and the German Raupenleim ("insect lime"), or, correctly, caterpillar-glue. When gas tar, printers' ink or a mixture of the two are used a tight-fitting band of tarred sheathing paper should be first tacked around the tree and the substance spread on the band, thus avoiding injury to the bark. With Raupenleim as ordinarily used there is not much danger of injury. Before applying it the trunks of the trees should be scraped smooth at the point on which the band is to be placed. The substance is a German preparation whose composition is a jealously guarded secret. It has been used by the State Board of Agriculture with fairly good success against the gypsy moth for two seasons, but as it was not found to meet all the requirements of the work its use was discontinued. It is apparently the product of some mineral oil. Prof. John B. Smith, entomologist to the New Jersey Agricultural Experiment Station, who has kindly placed at my disposal the notes made on a series of experiments with this substance, finds that aside from its value in stopping the passage of insects up and down trees, it has also proved an excellent means of preventing borers from laying their eggs on tree trunks. Against the sinuate pear borer, which has caused considerable damage to orchards in New Jersey, Professor Smith found it to be a most successful preventive when properly applied. For this purpose it was applied in a coat three-sixteenths of an inch thick over the whole trunk of the tree as far as the lower branches.

For use against the canker-worms apply the Raupenleim in a band one-fourth of an inch thick and three to four inches wide around the tree. The Raupenleim may be put on with a paddle and spread with a stiff brush. The bands should be put on the trees about October 1 and freshened the following spring. If left on during the summer these bands will prevent such trees as have been properly cleaned of the eggs of the tussock moth from becoming infested with the caterpillars of this insect. Raupenleim may be purchased in the market at from ten to fifteen cents per pound, according to the quantity desired.

At the suggestion of Professor Smith, Prof. F. L. Nason of the New Jersey Agricultural College, New Brunswick, N. J., has conducted a series of investigations concerning the composition of Raupenleim, and has at last succeeded in preparing a substance almost identical with the foreign product. Professor Nason's compound is known under the name of "dendrolene," and is nearly if not quite as effective as the Raupenleim. It may be purchased at about six cents per pound, and is well worth a trial in protecting trees against canker-worms.

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While this paper is intended to treat of insecticides rather than insects, a few words additional concerning the application of some of these methods in combating the canker-worm and tussock moth may not be inappropriate, since these insects have been unusually abundant in many parts of the State this year.

The apple orchards of eastern Massachusetts were, as a rule, seriously damaged by the canker-worms, and in some orchards the fruit crop was almost a failure from this cause. The ravages of this pest can be obviated by banding the trees with Raupenleim or tar, as already indicated, to prevent the ascent of the female moths.

The canker-worms being of two kinds, fall and spring, this work should be done early in the fall and the bands kept fresh up to the time severe cold weather sets in, and should also be put in working order with the advent of warm weather in the spring. The wingless female moths ascend the trees on warm days to lay their eggs, and the same weather that will bring them out will also soften the bands — if they have been properly put on — and make them sufficiently adhesive to catch the moths.

The value of the presence of chickadees in orchards has been ably demonstrated by the ornithologist of the Board, Mr. E. H. Forbush, in a recent bulletin. These birds, as has been pointed out by Mr. Forbush, destroy immense numbers of canker-worm moths and eggs, and may be made to frequent orchards by placing meat, bones, etc., in the trees during the winter. Where these precautionary measures have been neglected and the canker-worm larvæ appear in the trees, spray promptly and thoroughly with arsenate of lead, as directed.

Against the tussock moth, which has caused so much damage this year to parks, street trees and even small orchards in Boston and the suburban district, as well as elsewhere in the State, somewhat different methods should be employed. The present year the pest devastated many fine elms on Boston Common and stripped

and in some cases seriously damaged numerous street trees. Many horse-chestnut, elm, pear and cherry trees stripped in midsummer by this insect in Boston, Chelsea, East Boston and Charlestown have been unable to throw out a second crop of leaves (like the linden) and are as bare as in winter. To prevent the ravages of this pest in the cheapest and most efficient manner the infested trees should be thoroughly cleaned of the nests in the winter when the branches are bare. These nests, from their white, frothy appearance, are readily seen and easily removed. Where they occur in crevices in fences and in other places difficult of access, they may be destroyed by the use of crude mineral oils. After the larvæ hatch, trees where they are most abundant should be heavily sprayed with arsenate of lead wherever it is practical to do so. In the same way, so far as possible, trees which have been cleared of nests should be isolated from infested trees by means of Raupenleim or other suitable bands, those in public places being put on at a sufficient height from the ground to prevent injury to the clothing of passers by. These methods, if thoroughly enforced, will reduce the numbers of the pest in localities where employed to a point where it will do no particular damage.







MASSACHUSETTS  
CROP REPORT

FOR THE

MONTH OF OCTOBER, 1895.

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ISSUED BY

WM. R. SESSIONS,  
SECRETARY STATE BOARD OF AGRICULTURE.

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# CROP REPORT FOR THE MONTH OF OCTOBER, 1895.

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OFFICE STATE BOARD OF AGRICULTURE,  
BOSTON, MASS., NOV. 1, 1895.

Bulletin No. 6, Crop Report for the month of October, is presented as the final issue of the season. It is believed that the work accomplished in this line this season has been of value to those who have been the recipients of the bulletins. The sincere thanks of this office are extended to correspondents who have helped to this result. It is hoped the work may be continued another season.

The special articles printed this season have been as follows: Bulletin No. 1, "Tuberculin, — What it is, how it is used, what it does;" Bulletin No. 2, "Hints on Land Drainage;" Bulletin No. 3, "Birds as Protectors of Orchards;" Bulletin No. 4, "The San José Scale;" and Bulletin No. 5, "Insecticides." In this issue may be found an index to the bulletins of 1893, 1894 and 1895, which may prove of use to those who preserve a file of the bulletins.

## PROGRESS OF THE SEASON.

Report No. 131 (October, 1895) of the Statistician of the United States Department of Agriculture makes the general condition of corn 95.5 per cent against 96.4 for the month of September. In most of the Southern States the condition has fallen since the last report.

The returns of yield per acre of wheat indicate a production of 12.5 bushels, being six-tenths of a bushel less than last October's estimate. The indicated quality for the country is 85.7.

Preliminary reports of yield of oats average 29.6 bushels per acre, a considerable improvement upon 24.5 bushels in 1894, 23.5 in 1893 and 24.3 in 1892. Returns as to quality show a general average of 91, the range being from 76 in Texas to 104 in South Dakota.

The average yield of rye, as indicated by the preliminary returns, is 14.4 bushels per acre, against 13.7 bushels in 1894; 13.3 bushels in 1893 and 12.7 bushels in 1892. Quality of rye is 92.4.

Yield of barley per acre, 26.4 bushels; in 1894, 19.3 bushels; in 1893, 21.7 bushels; in 1892, 23.7 bushels. General average in quality, 91.5 per cent, or slightly better than that of last year. Minnesota had one of the best crops of the year.

Condition of buckwheat, 84.8, a loss of 2.7 points since September 1. This crop is much better than it was last year, when it stood at 72.

The general average of condition for potatoes is 87.4, a reduction of 3.4 points since September 1. A year ago the average was 64.3, the lowest, with two exceptions, ever recorded. Drought has been the most widespread cause of reduced condition and there has been some little injury from rot. The most serious complaint of the potato grower this year is the low price of the product, particularly in the North-west.

Sweet potatoes have suffered quite seriously from lack of rain during the past month, and their condition has been materially reduced in many States.

The condition of cotton is reported to be 65.1, a falling off of 5.7 points from the September condition, which was 70.8. Extensive damage is reported from early rains, recent droughts and from the ravages of bollworms and other insects.

A decline in the condition of tobacco of over 2 points reduced the general average to 80.3, on October 1. Droughts and frosts of the last of September are the principal causes of the lowered condition. The general average condition of tobacco at the same date last year was 84.5.

The general average condition of rice is 90.3 against 94.5 on September 1. This decline is due principally to drought.

The product of hops is returned at 80.9 per cent of a full crop. The quality is generally very good, except in Washington, where the louse and mold have done material damage.

A general falling off in the condition of sugar-cane, due to

drought, is shown in the present report. The prospective crop is much under that of 1894.

Sorghum seems to have suffered little from dry weather, and most States report conditions reaching 90 or above.

The continued drought, hot weather and high winds of September, causing premature ripening and dropping, have reduced the condition of apples 2 points. It is thought both the eating and keeping quality of the fruit has been much impaired, and in many sections a tendency to rot is already noted. The average condition now stands at 70.6.

In Massachusetts the average yield of rye per acre is given as 19.9 bushels; the average yield of oats as 36; the average condition of buckwheat October 1, as 100; the average condition of corn as 103; the average condition of potatoes as 102; the average condition of tobacco as 100; and the average condition of apples as 58.

## TEMPERATURE AND RAINFALL FOR THE WHOLE COUNTRY.

FROM UNITED STATES WEATHER-CROP BULLETIN.

*Week ending September 30.* — Week warmer than usual over the western portions of the plateau region, on the Pacific coast and throughout the east Gulf and Atlantic coast States. From the Rocky Mountains eastward to the Mississippi River and in the Lake region and Ohio valley week cooler than usual. The seasonal temperature from March 1 to September 30 (214 days) exceeded the average over the northern and central portions of the country, from the Missouri valley eastward to the Atlantic coast, from 1° to 2° per day. Over the eastern Rocky Mountain slope, plateau and Pacific coast regions the season was cooler than usual. Over limited areas in different parts of the country the rainfall has exceeded the average, but generally the week has been very dry. The crop season closes with a marked deficiency in rainfall in the States northward of the Ohio River, where the seasonal fall has ranged from 60 to 75 per cent of the average. Over the north Pacific coast, portions of the Southern States and a large part of the eastern Rocky Mountain slope the rainfall has been excessive. Crops generally harvested. In many sections fall ploughing and seeding are retarded by the dryness of the soil.

## SPECIAL TELEGRAPHIC REPORT.

*Week ending September 30.* — Boston : cool, but without damaging frost ; rain sufficient to break surface drought in most places, but all water supplies exceptionally low ; cranberry picking well advanced ; corn mostly cut ; apples being picked ; potato digging well along.

## MASSACHUSETTS WEATHER, 1895.

[COMPILED FROM DATA FURNISHED BY THE NEW ENGLAND WEATHER SERVICE.]

January gave slightly warmer weather than normal in the eastern part of the State, and slightly colder in central and western counties. There was no general thaw and no extremely cold weather. The precipitation was above the normal in the southern part, but less than the usual amount came in the centre and north. About the normal amount of snow fell during the month, and with the steady temperature most of it remained on the ground, giving a good protection to all roots and shrubs. The only storm of marked severity was that of the 26th–27th, when some damage was done along the coast by the wind, and travel was hindered in the interior by drifting snow.

February was cold and dry. The temperature averaged from 2° to 7° a day below the normal throughout the greater part of the State. The temperature rose several degrees above freezing in south-eastern Massachusetts on the early morning of the 8th, then fell rapidly and to a low point under the influence of north-west winds which prevailed. At Provincetown the daily range on the 8th was the greatest ever recorded there in fourteen years of observation, while the minimum on the 6th was the lowest ever registered there in that time. The precipitation was generally in the form of snow, except in the extreme south-east, and most of it came in the storm of the 7th–8th. This storm was extremely severe, and great damage was done along the coast by the high tide and terrific winds. The ground was mostly well covered with snow throughout the month. There was some injury to peaches by the cold spell, and the very high wind drove the cold into many cellars that were considered frost-proof.



The weather for March did not depart far from the normal in any respect, though it was slightly cooler and drier than March generally gives in some places. The storms were not so severe as are many times experienced, and the snow gave a good covering on the fields and pastures, except along the immediate coast, until near the end of the month.

April departed very little from the normal in temperature, although it was slightly warmer in central counties; but an excess of rain came, except in the extreme south-east. The storms of the 8th-9th and 13th-15th filled the ground and reservoirs; and the intervalles on rivers rising in the north were badly washed by the floods that came from the melting snow and extremely heavy rainfalls which fell there. In the Berkshire hills the highways were badly blocked by snow-drifts till after the 15th of the month.

May was much warmer than is usual, the temperature range for the month was great and the daily changes large and rapid. A sharp frost occurred in eastern sections on the morning of the 2d, the temperature falling several degrees below freezing. General and heavy frosts occurred on the 14th and 17th and local frosts on the 19th and 22d. Snow was seen on the tops of the Berkshire hills on the 15th. The precipitation was considerably below the normal, except in the south-eastern counties, and was generally insufficient for the proper nourishment of crops. The rainfall was fairly well distributed throughout the month, and amounted to from one and one-half to two and one-half inches in all north-eastern, central and western counties, and from three and one-half to nearly five inches on the Cape and the Island of Nantucket. In western towns the springs and streams were reported to be the lowest for the season for many years. There was more than the usual amount of sunshine, and a marked absence of heavy rain and wind storms. Dr. Jabez Fisher of Fitchburg reported apple bloom on the 12th, — three days later than in 1894, but eleven days earlier than the average for thirty-nine years.

In northern counties occasional showers fell during the month of June, and the top of the ground was moist enough for most purposes; but in all central and southern districts not more than a trace of rain came from the 6th to the 25th,

and the ground got very dry, but the cloudy, wet weather of the last week changed the aspect of everything. At most places the total rainfall for the month was slightly below the normal. A hail-storm in the vicinity of Warren, in Worcester County, on the 23d, did considerable damage. Some of the hailstones were as large as hen's eggs. At Blandford a severe hail-storm occurred in a limited strip on the 25th, cutting down and almost destroying all crops. A high wind accompanied the thunder-storm on the 29th, near Leeds, in Hampshire County, and did some damage to heavy grass, potatoes and corn. The temperature was slightly above the normal for the month in eastern districts, and considerably so in central. The warmest day at most places was on the 2d. Most correspondents reported a marked scarcity of the insect-eating birds, such as the bluebird, phoebe, robin and thrush; while the seed-eating birds, like the warblers, flycatchers, sparrows, etc., were nearly as plenty as usual. The scarcity of the first-named birds was probably due to the severe cold in the southern part of the United States last winter, as most of those birds winter there. Not only were the birds probably killed, but many insects that they feed on were also destroyed.

The weather for July was cool and unusually cloudy and rainy. The actual amount of rainfall was less than the normal for the month at many places, especially in the south-east, but the total number of rainy days was in excess. At Boston rain fell to an appreciable amount on twelve days, while a trace was recorded on two other days. The total fall, however, was half an inch less than normal, being 3.59 inches. The temperature was generally lower than usual, with few oppressive days, and no extended spell of hot weather. The cyclonic and anti-cyclonic areas were all of slight energy and poorly defined, except the last two cyclones. One of these passed north-easterly across our district on the night of 27th-28th, giving heavy rain and high winds; the other passed easterly to the north of New England on the 30th-31st, with heavy rain and severe local storms. Other sharp local storms occurred, but they were of short duration and confined generally to limited districts. On the 13th much damage was done by hail in Hampshire

and Worcester counties. On the 9th 4.13 inches of rain fell at Fitchburg in three and one-fourth hours. In one and three-fourths hours 3.37 inches of the amount was recorded. Dr. Jabez Fisher, who reported the fall, stated that it was unprecedented in his thirty-one years of observation.

Generally the weather during August was very favorable for vegetation and for farm work. Unusually low minimum temperatures were recorded, and the maximum was not so high as is usually experienced. At the Weather Bureau Office in Boston the temperature was below the normal on the 1st-3d, 12th, 13th, 20th-22d and on the 30th, and was above on all the other days. The warmest spells were from the 4th to 11th and from the 23d to 28th. The lowest temperature was on the 22d, when light frosts were general in low lands all over the State. There was plenty of sunshine, few severe thunder-storms or heavy damaging rains and a rainfall slightly below the usual amount at most places. At Boston the deficiency amounted to about one and one-fourth inches, but at Springfield to only three-fourths inch. At the former station only three thunder-storms were noted.

September was warmer than usual, with less precipitation and clouds and with generally pleasant weather. The warmest spell of weather for the month, and at many places the warmest for the season, was on September 21 to 23. The maximum temperature was generally between 95° and 100°. The coldest spell was on the 14th to 16th at most places, when the mercury fell below 40° at many places and light frosts occurred in valleys. The precipitation was comparatively light in all sections, and at the end of the month water supplies were unusually low. Several severe thunder-storms, some of which were accompanied by hail, occurred during the month.

Generally fair, cool weather prevailed during October over the greater part of the State, and harvesting has been completed and fall ploughing carried on under favorable conditions, except where the ground remained too dry in western counties. In the eastern part of the State the heavy rain of the 12th to the 14th filled up the ground and all reservoirs, and although it delayed work on low land, it put the ground into first-class shape for ploughing and seeding generally.

There was less than the usual amount of rainy weather and cloudiness, but in the eastern part of the State, owing to the heavy rainstorm referred to, the total for the month was considerably above normal. At Boston rain began at 1.55 P.M. on the 12th and continued till 4.30 A.M. of the 14th, and in that time occurred the heaviest continuous rainfall ever recorded at the weather bureau station there. The total amount was 5.64 inches, 4.85 inches falling from 8 P.M. on the 12th to 8 P.M. on the 13th. Immediately surrounding Boston the fall was greater than at that station, but in the south-eastern part of the State very little came, and in western districts it was not out of the ordinary. At Framingham 8.49 inches was recorded by the Boston water works, and at other places between that city and Boston the fall was from 6 to 8 inches.

The mean temperature was about 1.7 degrees per day below the normal at Boston, and there were few rapid or extreme changes and no spells of continued warm or cool weather. The first heavy frost of the season occurred at many south-eastern districts on the morning of the 11th. On October 6 an unusually high tide prevailed along the eastern coast, caused by a cyclonic storm that was moving northward far out to sea. It was one of the highest ever noted at Beverly Farms.

#### CROPS OF THE YEAR.

The season opened slowly and was later than usual at the end of March. The ground during April was cold and no amount of seed had been put into it at the end of the month. Fall seeding generally wintered well. Promise of a light crop of grass on old meadows and dry fields, owing to drought and frost. Apple bloom rather light, it being the off year; but the bloom of pears, peaches, etc., was generally large. Great damage was done to new growth on grapes, to grass, fruits, vegetables, corn and potatoes by the general frosts of the 14th and 17th of May. Moisture generally insufficient for the proper nourishment of crops, and grass suffered in particular. On the whole, the month was favorable for the forwarding of farm work and the outlook for crops was encouraging. Canker worms quite prevalent;

other insect pests, except cut worms, not particularly troublesome. Supply of farm help generally equal to demand, but the proportion of really good help was as usual small. Twenty dollars per month and board or \$1.50 per day without board considered a fair average of wages paid good help.

July 1 cut worms were reported as causing considerable trouble, particularly in the Connecticut valley. Indian corn was reported as having stood the dry weather better than most crops and looking well, stand and color both being good, with a general increase in acreage. Haying had begun, with the probability of a light crop. The cloudy, wet weather the last week changed the aspect of everything, and even grass, except on the driest knolls, thickened up and began to grow with new energy. Considerable cut grass was injured in the field. Early potatoes looked well in most sections. Early market-garden crops generally slightly below average in both yield and price. Quantity of dairy products about average, with slight but general decrease in the prices received. Pastures generally short and dry. Strawberries, blackberries and raspberries light crops, owing to late frosts and drought.

August 1 little damage from insects was reported. Horn flies and other flies quite troublesome in many localities. Indian corn in excellent condition; about the usual amount grown for the silo. The rains materially helped the hay crop, which proved to be about three-fourths of an average. Much of that cut early was damaged by rain, otherwise quality as a rule excellent. All fodder crops almost universally reported as in good condition. Market-garden crops generally improved by rains. Early potatoes looked finely. Pastures improved very much during the month. Rye a good average crop, and in many sections excellent. Oats considerably above average. Barley a full average crop. Considerable damage done to crops at Warren and Blandford by hail on the 13th.

September 1 grasshoppers were reported as doing considerable damage to pastures and mowings, particularly in the western counties. Rowen promised to be a fair average crop. Winter apples generally reported to be a very poor crop. Potatoes promised to be considerably above the aver-

age in nearly all localities; considerable complaint of rot and prices low. Indian corn in good condition, with large stover and well set with ears. Sweet corn an excellent crop. All kinds of soiling crops reported in excellent condition. Pastures improved, but hardly recovered from the drought of the early part of the season. Oats better than last year. Tobacco crop of large growth, with a large leaf of fine color, remarkably free from imperfections and secured in excellent condition. During August crops ripened well, and the conditions were very favorable for harvesting and summer ploughing.

October 1 weather for September excellent for harvesting. Hardly enough moisture in the air. Cranberries, tomatoes and apples scalded by hot sun on the 21st-23d. Corn crop unusually large and of generally excellent quality. Potatoes more than an average crop, of generally good quality. Potato rot prevalent, but not to a dangerous degree. Root crops promised well. Apples very light in all sections and of rather poor quality. Pears and peaches large crop of generally good quality. Grapes a good average crop of good quality. Cranberries a little below an average crop.

In the circular to correspondents returnable to this office October 25 the following questions were asked:—

1. Have root crops proved to be average crops?
2. What is the condition of farm stock?
3. What is the condition of fall seeding?
4. How have prices for crops raised for market compared with former years?
5. Which of the leading crops in your locality do you think have been most profitable?
6. Which of the leading crops in your locality do you think have been least profitable?
7. Considered as a whole, has the season been a profitable one for your farmers?

Returns were received from 104 correspondents, from which the following summary has been made:—

#### ROOT CROPS.

Root crops are full average crops in all sections of the State, fully three-fourths of the correspondents speaking of

them as average and over half the remainder as above average. Wherever any falling off in condition is reported it is ascribed to the drought. Turnips are almost the only crop that is spoken of as below average.

#### FARM STOCK.

Farm stock is generally reported to be in good condition, though some say that it is rather thin in flesh. Pastures, while not first class, have been generally fair, and where there has been a deficiency in pasture feed the condition of stock has usually been kept up by feeding at the barn. The droughts of previous years had led farmers to pay more attention to soiling than formerly, hence stock has not suffered as much from poor pastures as would otherwise have been the case. The heavy rains of the past month have helped pasturage materially and improved the condition of all farm stock.

#### FALL SEEDING.

Fall seeding is not up to the average in condition, and in fact is at best only fair. The drought delayed seeding very much, and that which was put in did not progress as fast as was desired, hence many correspondents report it as backward; others speak of it as thin and short. Still, there is little doubt that the condition would have been much worse had it not been for the heavy rains of October. From now on the condition should improve.

#### PRICES.

Prices are almost universally reported to be lower than for some years. Only seven correspondents speak of them as average and only two as above average. Several speak of prices as lower than ever before in their recollection. The cause usually assigned for these low prices is the unprecedented yield of many crops raised for market all over the country. Potatoes and onions have brought especially low prices.

#### MOST PROFITABLE CROPS.

Some correspondents say that they cannot tell which crops have been most profitable and others report that there has

been no profit in anything. Thirty-eight consider hay to have been among the most profitable crops ; 33, corn ; 16, potatoes ; 11, tobacco ; 9, dairy products ; 5, oats ; 4, apples ; 4, cabbages ; 4, cranberries ; 3, asparagus ; 2, peas ; 1, poultry products ; 1, root crops ; 1, turnips ; 1, carrots ; 1, beets ; 1, peaches ; and 1, blackberries.

#### LEAST PROFITABLE CROPS.

Forty-eight correspondents give potatoes as among the least profitable crops ; 17, apples ; 12, onions ; 7, cabbages ; 6, hay ; 4, corn ; 2, beans ; 2, strawberries ; 1, buckwheat ; 1, oats ; 1, cucumbers ; 1, squashes ; 1, peas ; 1, root crops ; 1, tomatoes ; 1, currants ; and 1, turnips.

#### PROFITS OF THE SEASON.

According to the reports received, the season, in spite of the good crops in most localities, has proved to be anything but a profitable one. This condition is chiefly due to the low prices which prevail and the slow sales which are made. Some correspondents speak of drought as shortening crops and thus reducing the profits. Special crops, such as tobacco, which are not yet sold, may change the condition in some localities, but the fact remains that the great majority of correspondents speak of the season as either unprofitable or only fairly profitable. Several correspondents allude to the scarcity of help as increasing expenses and so cutting down profits.



## NOTES OF CORRESPONDENTS.

(Returned to us October 25.)

## BERKSHIRE COUNTY.

*Egremont* (J. H. ROWLEY). — Root crops have proved to be average. Farm stock is in good condition. Fall seeding not in very good condition; growth small on account of the drought. Taken as a whole, prices for crops raised for market are fully up to former years. Corn has been our most profitable crop and apples our least profitable one, owing to the severe frost in May. When compared with any one year in the last three the season has been a profitable one.

*Monterey* (WM. S. BIDWELL). — Root crops have proved to be better than the average. Farm stock is in good condition. Fall seeding is in fair condition. Prices for all crops have been less than in former years. Dairy products have been most profitable and potatoes least profitable. The season has been less profitable than usual. Showers have wet the surface of the ground frequently and have kept the fall feed fully equal to the average, and dairy products yield a fair return.

*Alford* (L. T. OSBORNE). — Root crops are above the average. Farm stock is below the average in condition. Fall seeding is badly injured by drought. The price of butter, apples, potatoes and grain is lower than in former years. Dairying and poultry products have yielded a profit, but there is little profit in the sale of crops. Hay has been our most unprofitable crop, being very light, owing to dry weather. Farmers have been troubled for water and obliged to feed stock much more than common, which reduces the profits.

*Richmond* (T. B. SALMON). — Root crops have proved to be average. Farm stock is in very good condition. Fall seeding is in good condition. Prices for crops raised for market are below the average. Hay has been our most profitable crop and potatoes our least profitable one. Considered as a whole the season has been a profitable one.

*Dalton* (W. B. BARTON). — Root crops are a good average. Stock is not up to the average in condition as pasturage has been

poor. Fall seeding is in fair condition. Prices for all crops raised for market are low. Milk has given us the most profit of any farm product and potatoes the least. I consider the season a fairly good one for profit.

*Williamstown* (S. A. HICKOX). — Root crops have proved to be average. Farm stock is not up to the average in condition. Fall seeding is below the average in condition owing to the protracted drought. Prices for crops raised for market have been lower than in former years.

#### FRANKLIN COUNTY.

*Rowe* (J. F. BROWN). — Roots have proved to be average crops. Farm stock is looking well. Fall seeding is in average condition. Prices are not as high as usual. Hay has been the least profitable crop. Farmers have no reason to complain in this section. Potatoes and corn were large crops. No. 1 in quality: oats very stout: roots and all garden crops fine: fruit a small crop, apples about a one-third crop and of rather poor quality.

*Ashfield* (CHAS. HOWES). — Root crops are fully average. Farm stock is looking well. Fall seeding is not in very good condition on account of dry weather. Prices for crops raised for market are not quite up to the average. Ensilage corn has been our most profitable crop and apples our least profitable one. Considered as a whole the season has not been a very profitable one.

*Whately* (FRANK DICKINSON). — Roots have proved to be average crops. On account of dry weather stock is not in usual flesh. Fall seeding is in good condition. Prices for all crops have been lower than usual. Hay and tobacco have been our most profitable crops, and potatoes and onions our least profitable ones. For the working farmer the season has been a profitable one.

*Leverett* (W. L. BOUTWELL). — Root crops have proved to be average. Farm stock is in fairly good condition. Fall seeding is in good condition. Prices have been at least 40 or 50 per cent lower than in former years. Corn and tobacco have been our most profitable crops and onions and potatoes our least profitable ones. The season has most decidedly not been a profitable one for farmers.

*Montague* (C. S. RAYMOND). — Root crops are somewhat below average on account of dry weather. Stock that has been fed in the barn looks well, otherwise it is nothing more than in fair condition. Fall seeding is generally looking well. Prices have been at least 10 per cent less than usual. Possibly tobacco has been our most profitable crop, but at present I think hay should be so rated. Onions have been our least profitable crop. The season

has not been a profitable one; crops have been good but prices very low.

*New Salem* (DANIEL BALLARD).—Roots are average crops. Farm stock is looking well. Fall seeding is in fair condition; some pieces need more rain. Prices for market crops have compared favorably with former years, though potatoes are below the average in price. Grass and corn have been our most profitable crops and apples our least profitable one, being few in quantity and poor in quality. The season has been an average one for profit.

#### HAMPSHIRE COUNTY.

*Pelham* (J. L. BREWER).—Root crops are very good. Farm stock is in good condition and appears healthy. Fall seeding is in good condition. We have had fine crops, with the exception of hay, and prices are correspondingly low. Considering the prices received, none of our crops have been profitable. Dairy products alone have brought a profit, and the season has not been a profitable one.

*Amherst* (WM. P. BROOKS).—Root crops will be a full average, carrots unusually fine. Farm stock is generally in good condition; but the stock coming in from hill pastures is rather thin. Fall seeding is generally in good condition. Prices generally very low, half to two-thirds the usual prices: hay, apples and tobacco are exceptions. Hay, tobacco and corn have been our most profitable crops and onions and potatoes our least profitable ones. In grass and tobacco neighborhoods the season has been profitable; in onion neighborhoods it has not.

*Hadley* (L. W. WEST).—Root crops have proved to be average. Farm stock is in average condition. Fall seeding is below the average in condition. Prices for crops raised for market are lower than in former years. No crops have been profitable, dairy products have done the best. Everything outside the dairy has been unprofitable. The season has not been a profitable one considered as a whole.

*Northampton* (D. A. HORTON).—Roots are average crops. Farm stock is in good condition. Fall seeding is in fairly good condition. Prices of crops raised for market are from one-third to one-half less than in former years. Corn has been our most profitable crop. All crops are selling so low that I hardly know which has been the least profitable. The yield of all cultivated crops has been large.

*Southampton* (C. B. LYMAN).—Root crops are rather better than the average. Farm stock is in good condition. Fall seeding

is later than usual but is looking well. Market crops have been lower in price than for many years. Grass and tobacco are the best money crops this season. Potatoes are our least profitable crop, for although the crop is large and of good quality the price is so low that the farmer will hardly realize anything from the sale of his crop. The profit of the season will be very small.

## HAMPDEN COUNTY.

*Blandford* (E. W. BOISE). — Root crops one-third below average owing to drought. Farm stock is in good condition, many having fed from the barn. Fall seeding is in poor condition and but little has been done on account of the drought. Prices would perhaps average about 85 per cent of those of former years. Corn has been our most profitable crop and potatoes our least profitable one. As far as crops and dairy products are concerned the season has been a profitable one, but the condition of mowings is such that many must be reseeded, which will entail a large expense next year.

*Westfield* (C. F. FOWLER). — Root crops are up to the average. Farm stock is above the average in condition. Fall seeding is in better condition than for the last two seasons, but late-sown seed does not look quite right. Prices are much lower than usual with the exception of the prospect for tobacco, which looks better. Hay and tobacco have been our most profitable crops and potatoes our least profitable one. Crops are abundant but the low prices are very discouraging. Prices are not settled for tobacco, but the present outlook is favorable for fair though not exorbitant prices.

*West Springfield* (J. N. BAGE). — Root crops are above the average. Farm stock is in good condition. Fall seeding is light and poor. Prices are low; potatoes and onions are bought in large quantities for from 30 to 35 cents per bushel. Tobacco and cabbages are unsold but are thought to be salable at fair prices. It is hard to tell what crops have been least profitable; hay is a light crop with high prices; potatoes and onions heavy crops with prices very low. The season has not been a profitable one. Electric and State road building monopolizes most of the help so that it is scarce and high.

*Chicopee* (R. W. BEMIS). — Root crops have proved to be average. Farm stock is in good condition. Fall seeding has been rather late. Prices for crops raised for market are not quite as high as in former years. It is impossible to say as yet what crops will be most profitable and what least profitable. Considered as a whole the season has been a profitable one.

*Wilbraham* (F. E. CLARK). — Roots have proved to be average crops. Stock has been soiled for some time on account of short feed and is in good condition. Fall seeding is not up to the average, especially early seeding, which had to be reseeded. Hay, corn, oats, cabbages and apples have been our most profitable crops and onions, potatoes, squashes and pears our least profitable ones. The season has not been a profitable one for most farmers.

*Monson* (W. M. TUCKER). — Root crops are not up to the average. Farm stock is in good condition and is fully up to the average. Fall seeding is looking very well. Prices are very much lower than usual, with the exception of hay. Hay, corn and milk (if milk can be called a crop) have been our most profitable crops and potatoes our least profitable one. Very little money this season for the average farmer.

#### WORCESTER COUNTY.

*Dudley* (J. J. GILLES). — Root crops have proved to be average. Farm stock is in average condition. Fall seeding is somewhat backward on account of last month's drought. Prices for crops raised for market are 20 per cent lower than in former years. Corn has been our most profitable crop and potatoes our least profitable one. Taken as a whole the season has been a profitable one.

*Oxford* (D. M. HOWE). — Root crops have proved to be average. Farm stock is in good condition. Fall seeding is in good condition. Prices are about the same as usual. Cabbages and turnips have been our most profitable crops and potatoes our least profitable one; the crop being good but prices low. The season has been a profitable one on the whole.

*New Braintree* (C. D. SAGE). — Roots are average crops. Farm stock is in good, thrifty condition. Very little fall seeding has been done but it is in good condition. Prices are generally lower for market crops than in former years. Oats and corn have been our most profitable crops and potatoes our least profitable one. Considered as a whole the season has been a fairly prosperous one, as all crops, with the exception of hay, were rather better than the average. It will take a number of years for many pastures to recover from the drought of the past two seasons.

*Dana* (E. A. ALBEE). — Root crops are more than average. Farm stock is in good condition. Fall seeding is not in very good condition. Prices rule about 80 per cent of those of former years. Grass has been our most profitable crop and potatoes our least profitable one, no sale to speak of. Not much fruit. The season has not been a profitable one.

*Templeton* (LUCIEN GOVE). — Root crops are a full average ; better than last year. Stock is looking in better condition than last season. Fall seeding is generally in good condition there having been sufficient rains to keep the surface moist. Prices are lower than for a long time except for hay. Corn, potatoes and hay have been our most profitable crops and apples, small fruits and vegetables our least profitable ones. I do not think the farmers have made money from their season's labor.

*Fitchburg* (JABEZ FISHER). — Roots are average crops. Farm stock is in good condition. The growth of fall seeding is backward but it is otherwise looking well. Prices will average 10 per cent less than in former years. The crops upon which the most skill and fertilizer have been expended have been most profitable and *vice versa*. Farmers who have held their own this year have done very well.

*Berlin* (P. B. SOUTHWICK). — Root crops have proved to be average. Farm stock is in very good condition. Not a great amount of fall seeding has been done and it looks fairly well. Prices have been considerably below the average. Corn has been above the average ; potatoes a fair average ; hay below average ; oats and onions above average ; early planted squashes fine, late planted injured by frost ; berries and small fruits somewhat below average ; apples a complete failure ; pears below average ; peaches above. Had prices been up to the average it would have been an average year for profit.

*Grafton* (S. E. STOWE). — Roots are average crops. All kinds of neat stock are in good condition. Fall seeding is in very good condition. All kinds of garden truck are much below former years in price. Hay, corn, peaches and apples have been our most profitable crops and cabbages and potatoes our least profitable ones. The season has not been as profitable as last year.

*Upton* (B. A. JOURDAN). — Root crops have proved to be average. Farm stock is looking very well. Fall seeding is in good condition. Think prices have been lower than in former years. Corn has been our most profitable crop and potatoes our least profitable one. Potatoes rot badly and there are many complaints of not half a crop. No apples near here.

#### MIDDLESEX COUNTY.

*Sherborn* (N. B. DOUGLAS). — Root crops are fully average. Farm stock is in average condition. Fall seeding is below the average in condition. Prices have been much lower than usual. Early potatoes and hay have been our most profitable crops and apples our least profitable one. This town is coming to be a large

peach-growing town and the growers have done very well this year. Taken as a whole the season has not been a profitable one.

*Marlborough* (E. D. HOWE).—Root crops have proved to be average. Farm stock is in as good condition as usual. Not much seeding has been done on account of dry weather; quite a little will be done just before freezing. Prices have been very low. Milk-producing crops have been most profitable and potatoes least profitable. The season has been only fairly profitable.

*Concord* (WM. H. HUNT).—Root crops have proved to be average. Farm stock is in average condition. The usual amount of fall seeding has been done and it is in good condition. The prices of truck crops have been the lowest for many years. Milk has paid well, as have also asparagus, hay and blackberries. Potatoes, beans, cabbages and onions have been our least profitable crops. For most farmers it has been a very poor season.

*Chelmsford* (P. P. PERHAM).—Root crops have been good. Farm stock is in better condition than it was a year ago. Fall seeding looks fairly well at present. Prices for all crops have been very low, but not much lower than usual. Hay and small fruits have been our most profitable crops and potatoes our least profitable one. As a whole the season has been a good average one.

*Billerica* (J. N. PARDEE).—Early root crops good; late sown probably below average. Farm stock is in good condition. Fall seeding caught well but has not made much growth on account of the drought. Prices have been the lowest for years. No crops have been profitable. Dairying has been about as usual, but farmers depending upon market crops have generally failed to pay expenses out of the proceeds of their sales.

*Woburn* (W. H. BARTLETT).—Root crops are better than the average, the fine fall having helped them very much. Stock is in fair condition. Fall seeding is in good condition. With a few exceptions prices have been fully up to the average but sales have been slow. Peas, asparagus, cabbages, beets and carrots have been our most profitable crops and early beans our least profitable one. As far as profits are concerned I find it all work and little money.

*Weston* (H. L. BROWN).—Root crops are average. Farm stock is in good condition. Fall seeding is not in good condition. Prices are very much lower than usual. There has been no profit in any crop and cabbages have been least profitable. On the whole the season has not been a profitable one.

## ESSEX COUNTY.

*Haverhill* (EBEN WEBSTER). — Root crops have been about average. Farm stock is in good condition. Some seed came up slowly on account of drought, but is looking better since the rain. Prices have been somewhat lower than in former years. Corn has been a good crop this season. Potatoes have been our least profitable crop on account of rot and low prices. The season has not been quite as profitable as usual.

*Groveland* (ABEL STICKNEY). — Root crops are above average. Farm stock is looking remarkably well. Fall seeding is not first class and the young grass looks small. Of late the prices for farm products have been very low. Hay has been our most profitable crop and fruit our least profitable one. So far as good crops are concerned the season has been profitable but prices have been quite small.

*Newbury* (G. W. ADAMS). — Root crops are rather above average. Farm stock is in very good condition. Fall seeding is backward but the average amount has been done. Prices are as a whole lower than usual. Corn has been our most profitable crop and strawberries our least profitable one. The season has been a very fair one for our farmers.

*Ipswich* (O. C. SMITH). — All kinds of roots have been full crops. Stock is generally in the best of condition. The catch of fall seeding has been good but growth has been somewhat checked by drought. Prices have been below the average, potatoes selling at 30 cents per bushel. Hay has been our most profitable crop and potatoes our least profitable one, owing to rot and low prices. Profits will figure small this year.

*Marblehead* (WM. S. PHILLIPS, Jr.). — Root crops have proved to be average. Farm stock is in very good condition. Fall seeding is up to the average in condition. Prices have been much lower than for the last few years. Perhaps as much money has been received from potatoes as from any crop this season. Up to date cabbages have brought the least of any crop. The season has hardly been a profitable one as the rot in potatoes and the continued low market have made it a hard year for farmers.

## NORFOLK COUNTY.

*Franklin* (C. M. ALLEN). — Root crops have been nearly average. Farm stock is not quite up to the usual condition. Fall seeding is not up to the average in condition. Prices have been 10 per cent less than in former years. Potatoes have been our



most profitable crop and hay our least profitable one. On the whole the season has not been a profitable one.

*Millis* (E. F. RICHARDSON). — Root crops have proved to be average. Farm stock is in good condition. Fall seeding is below average in condition on account of dry weather. Prices have been less than usual for all crops, especially potatoes. Hay and potatoes have been our most profitable crops and apples our least profitable one. The season has been a fair one for profit.

*Cohasset* (E. E. ELLMS). — Root crops have proved to be average. Farm stock is looking extra well. Fall seeding is in good condition. Prices for crops raised for market have been very much less than in former years. Potatoes and peas have been our most profitable crops and cabbages our least profitable one. The season has been a very profitable one indeed for farmers.

#### BRISTOL COUNTY.

*Mansfield* (WM. C. WINTER). — Root crops have been up to the average. Farm stock is generally in good condition. Fall seeding is looking well. Except for potatoes prices are a little better than for the past few years. Hay has been our most profitable crop and potatoes our least profitable one. The present year has been an improvement on the past two or three but is hardly a profitable one.

*Taunton* (C. H. WILMARTH). — Root crops have turned out to be average. Farm stock is in good condition. Fall seeding is well advanced. Prices for farm products are about the same as usual. Corn and potatoes have been our most profitable crops. The season has been a profitable one, taken as a whole.

*Dighton* (J. N. PAUL). — Roots are full average crops. Farm stock is in good condition. Prices are very much lower than usual. The strawberry crop was the poorest in quantity, quality and price ever grown; potatoes were a good crop but sold for very low prices; cabbages a good crop but did not pay for marketing; onions, asparagus and beans were good crops but sold very low. No profit in anything this year.

*Somerset* (JOSEPH GIBBS). — Drought has materially reduced the yield of root crops. Farm stock is in good condition. Fall seeding is not in good condition and many fields will have to be reseeded. Prices for farm crops have ruled the lowest for years. The hay crop is the only paying crop this season. The season on the whole has been a very unprofitable one in this section.

*Westport* (A. S. SHERMAN). — Root crops are a good average. Farm stock is in very good condition, milch cows are doing well. Fall seeding is in very good condition. Prices are very low, much

lower than in former years. Hay has been our most profitable crop and potatoes our least profitable one. Hay is a fair crop; corn very good; potatoes rather slim, owing to blight; onions good; turnips fair, have suffered from dry weather; apples scarce and poor; pears plenty; grapes abundant.

#### PLYMOUTH COUNTY.

*West Bridgewater* (F. E. HOWARD). — Root crops have proved to be average. Farm stock is in good condition. Fall seeding is in fair condition. Prices of crops are rather lower than usual with the exception of hay. Hay has been our most profitable crop and corn our least profitable one. The season has been more profitable than some previous ones for the farmer.

*Marshfield* (J. H. BOURNE). — Root crops are fully as good as usual. Farm stock is in good condition. Fall seeding is not as good as usual on the whole, owing to dry weather. Prices for crops raised for market have been somewhat lower than usual, especially potatoes. Milk has yielded us the most profit of any farm product and apples the least. On the whole the season is nearly as good as usual.

*Lakeville* (ELBRIDGE CUSHMAN). — Root crops have proved to be average crops. Farm stock is in fair condition. Fall seeding is in fair condition. Prices never were so low in my memory. Hay has been our most profitable crop and potatoes our least profitable one. The season will not be a profitable one. Most crops have made abundant yields but as a rule prices are below the cost of production. Also the large crops have necessitated an extra amount of labor to handle them.

#### BARNSTABLE COUNTY.

*Falmouth* (D. R. WICKS). — It has been too dry for root crops and they are small. Stock is in good condition as feed has been good this fall. What fall seeding has been done is very good. Prices have been low and are low now. Potatoes have been our most profitable crop and turnips our least profitable one. Taken as a whole the season has not been a profitable one.

*Mashpee* (W. F. HAMMOND). — Root crops are above the average. Farm stock is in very good condition. Fall seeding is in fair condition. Prices have been above the average. Cranberries have been our most profitable crop and corn our least profitable one. The season has been, on the whole, a profitable one.

*Barnstable* (JOHN BURSLEY). — Root crops have proved to be average. Farm stock is in good condition. Fall seeding is in poor condition. Prices have been 25 per cent lower than in former

years. Cranberries have been our most profitable crop and onions and potatoes our least profitable ones. Crops have been large and better prices would have made the season a very profitable one.

*Brewster* (J. H. CLARK). — Root crops have proved to be average. Farm stock is in very good condition. Fall seeding is in very good condition. Prices have been better than the average this year. Cranberries have been our most profitable crop and potatoes our least profitable one, owing to the low prices. The season has, on the whole, been a profitable one.

*Eastham* (J. A. CLARK). — Roots are full average crops. Farm stock is in good condition. Fall seeding is in good condition. Prices for crops have ruled low. Asparagus has probably been our most profitable crop. I think there has been the least profit in potatoes; although the crop was good prices have ruled low. The season has been an average one for profit.

#### DUKES COUNTY.

*West Tisbury* (GEO. HUNT LUCE). — Root crops have proved to be average. Farm stock is in good condition. But little fall seeding done here. Prices for crops raised for market have ruled lower than in former years. Hay has been our most profitable crop and potatoes our least profitable one. The season has not been a profitable one.

#### NANTUCKET COUNTY.

*Nantucket* (C. W. GARDNER). — Root crops are not harvested yet. Farm stock is in good condition. Fall seeding is not looking first rate. Prices are very much lower than usual on account of the quantity of all crops. Potatoes have been our most profitable crop and corn our least profitable one on account of the ravages of the corn worm. The season has not been quite up to the average for profit.



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